JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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EDITORIAL NOTES—GAS, &c.

Effects of the Coal Strike.

THE intelligence published during last week regarding the coal strike was as capricious as the weather—rays of sunlight, clouds, and gloom intermingled and alternated in kaleidoscopic fashion. But the week has passed; and the main position has not changed, but the strain and tragic consequences for the country have become more tense, weighty, and burdensome. The paralysis of trade spreads, the army of workless has grown greater, acute misery reigns in many parts of the land, and transport has been curtailed to a degree that has caused vast and widespread public inconvenience. But, speaking generally, where the poignancy of actual distress is not felt, the community is bearing with philosophic mien the burden that is being inflicted upon it by a few uncompromising leaders of the miners. But it is a pretty spectacle that the country has before it—a Government and a whole nation being "held up" by a handful of leaders of the organizations of the labour of one industry. The present situation would not have been thought possible a very few years ago. But here it is. And if this now, what of the future? These few leaders are at the moment as immovable as the Pyramids. They have stated their terms—a minimum wage on a schedule of rates of their own construction, without conditions as to minimum output or anything else. Their position is a monstrous one. These extremist dictators, however, feel their sovereign power at the moment, and are making the most of it; while the country is growing day by day very tired of them, their obstinacy, and their so-called irreducible demands. A joint conference is to be held again this week under the ægis of the Government; but the stiffened backs of those who are the obstacles to peace do not look like unbending.

Out of evil good may come. One of the unpremeditated effects of the present situation is seen among the unions of the country. The strike is bringing the old-time trade union leaders back into the field. They have their opportunity, to make a good and promising attempt to overthrow the ultra-Socialists who a few years since caught the ear of a majority of the rank-and-file of the unions, and so obtained a large amount of power. The present strike started with Socialism and Syndicalism on the wing. But the latter importation from more advanced socialistic countries than this has already fallen into bad odour among the senior trade unions. There was talk of sympathetic and universal strikes to compel the acceptance of the last shred of demand by the miners, without their own obligations being supplemented. But before the trade unions of the country could absorb and act upon the new doctrines and tactics of labour warfare, they found that the action of the miners was automatically throwing upon the funds in shoals the members of unions without part in the immediate originating trouble; and, without a fight, or even the prospect of reaping any advantage (such as settlement of a grievance), their funds have started being seriously encroached upon by unemployment pay. The compulsory expenditure of the funds in this way will do more than anything else to open the eyes of the older trade unionists to the effects of the new forms of militancy that the Socialists and Syndicalists are trying to force upon them. There is in some of the unions a palpable change of sentiment. Viewing these things, there is hope that we may rise from the present national trouble more secure than the country has felt during the past few years in the matter of the reasonableness of its labour.

There is the more immediate matter of concern to us, and that is the position of the gas industry in the matter of stocks, and its ability to serve the public during the continuance of the trouble. The supply of gas is a service as common as the supply of water; and, a supply being constantly and so conveniently available, the country almost forgets the existence of the industry. Last week Government, the Public Press, and the country awoke to the fact that the gas supply is dependent upon coal; and inquiries were at once instituted by Government and the Press as to how long gas undertakings could hold out. The reports that were made varied. There is a peculiarly wide divergence between the provision made by undertakings—even neighbouring ones. Among reports to hand of low coal stocks, such as for three weeks or so, some municipal concerns seem to take prominence; while the gas companies and the larger municipal concerns, as a general rule, have made what must be considered—or rather what it is hoped will prove to be—abundant provision. London is safe from an undiminished supply of gas for the next seven or eight weeks; and some of the suburban gas companies give the information that they can hold out for two, three, and more months. In certain places, there has been a precautionary diminution of the public-lighting service, as gas undertakings have not only lighting, but heavy cooking, heating, power, and industrial loads to meet.

But beyond the public lighting, there are no indications as to any official requests for moderation in use, though there will be a tendency in this direction. Sir J. Wolfe Barry in "The Times," and others elsewhere, have urged the public to economize in all daily-used commodities dependent for their production upon coal, in order to make the available supply of fuel endure as long as is possible. Here, again, the public will receive a valuable lesson. There is a general proneness to waste, where economy is not permanently enforced by rigid narrow means. The public is realizing the full meaning of the present coal stoppage; and there will be a natural inclination to contribute to the lessening of the future evil effects by present care, assuming the strike has no immediate ending. The saving the public will effect by self-restraint will, we fancy, through the demonstration, have a wonderfully good economic effect, by putting the brake on the wasteful use of fuel. It is remarked that the Government have a good reliance on the Metropolitan gas supply. The public departments have been urged by circular to be frugal in the use of coal and steam for cooking and heating, and for these purposes to make use of gas wherever possible. The public, too, are patronizing gas very extensively; and the gas industry will benefit from all the encouragement that can be given in this way at the present time. It is an opportunity, too, to give the use of coke a good fillip for local domestic purposes. Several gas undertakings have advertised that there is to be no present advance in coke prices for domestic consumption in their own areas. It is a politic movement, the benefit of which will be carried farther along in time than the duration of the present strike.

Opposing New Electricity Powers.

IN the very opening of the Private Bill work for the present session, there are presented to us two cases in which points have been gained by the enterprise of a few gas companies where a much larger number should have been concerned, and in one of which, as we shall presently show, there is yet time for gas companies who have a direct concern in the matter to take active measures to protect their interests against an attempt to legalize municipal operations that the very fact of parliamentary application admits to be illegal, and which have been declared to be so, in another form, by two Courts of Law in this country and one in Ireland. The difference between these decided cases and those that it is now proposed to legalize is such that the latter, in our opinion, constitute much worse examples of excess of powers, inasmuch as, in the decided cases, the municipal electric undertakings concerned went openly about the business of wiring and dealing in fittings, while, in the cases now under notice, they have been (as we understand the matter) doing practically the same thing in a circuitous manner by making the National Electric Construction Company, Limited, the vehicle (by agreement) for similar

operations, charging the consumers an extra sum per unit, and paying over to the National Electric Construction Company the addiional charge for doing for the electricity suppliers what they had no power to do for themselves.

Some twenty-one local authorities who have electricity supply powers have entered into these wiring and fittings agreements with the Company named. But the decisions of the Law Courts, that municipal electricity undertakings indulging in this business without specific powers were acting *ultra vires*, have caused some consternation among certain of the local authorities who have entered into the agreements with the Company. Hence the attempt of the Company to render acts legal that everything points to being illegal, by asking Parliament, through a Bill, to confirm the agreements in question. The Gas Companies' Protection Association recognized this as a matter involving important principles, and an extension of municipal trading in a manner not contemplated by Parliament; and on these grounds it was very properly thought that they were fully justified in taking action. Consequently, instructions were given to Messrs. R. W. Cooper and Sons to consider the matter, to see what steps could be taken to protect the interests of the gas companies affected, and to communicate with the companies. It was found that there were grounds for objecting on Standing Orders. Among those who lodged petitions against the measure were the Alliance and Dublin Consumers', Swansea, Canterbury, and Taunton Gas Companies —the three latter taking part in the movement originated by the Gas Companies' Protection Association. The result was the question came before the Standing Orders Committee last Wednesday; and, after a long discussion, a decision was come to by the Committee which ought to be of peculiar satisfaction to the gas companies concerned. It was to the effect that the Standing Orders should be dispensed with, and the promoters of the Bill be allowed to proceed with it, on the conditions that copies of the agreements proposed to be confirmed should be sent to the gas companies within the area of supply affected by the agreements, and that the promoters should not object to the *locus standi* of such gas companies against the Bill.

The importance of this decision cannot be overrated—especially as the promoters were proposing to resist the *locus standi* of the gas companies against the Bill, and moreover would not disclose to them the agreements which had been made with the separate authorities, and which, if confirmed, would allow the common law of the land to be overridden in favour of a private trading company, and make legal what is, in effect, admitted by the promoters themselves to be an illegality. Nevertheless, these promoters sought to close the mouths of the only parties, not parties to the agreement, who would be before the Committee on merits, and this, too, on a highly technical point, as to whether the petitioners had the right to be heard on the ground of competition, existing competition, the creation of new competition, or the improvement of existing competition. Fortunately, the Standing Orders Committee entertained a more reasonable interpretation of the equity of the case than the promoters; and they were obviously of opinion that this was one where parties other than those who were parties to the agreement should be before the Committee who would be considering the measure. In this spirit, they have not only opened the door to enable *every company* concerned in the matter *to deposit a late petition against the Bill* (the time in the ordinary course for such a proceeding having expired), but they have also placed the Company under an obligation not to put any technical impediments in the way of those companies laying their case before the Committee.

Need we, in view of such facility being conferred upon petitioners, and such injunction laid upon the promoters, urge upon every one of the gas companies affected by the agreements, and who will receive a copy of the one in which they are concerned, that, if they do not take up the advantage gained for them by the petitioners before the Standing Orders Committee, they will only have themselves to blame for anything that may happen hereafter. Furthermore, the petitioners who secured this advantage no doubt feel they have so far been fighting the battles of all the gas companies affected, and that it is not right they should bear the whole of the burden of endeavouring to prove the unrighteousness of this scheme for transforming an illegality into a legality. Important principles are also involved; and, this being so, it would be exceedingly foolish for the gas companies concerned, with the direct encouragement offered to them by the Standing Orders Committee, to neglect to put their case before the Select Committee—never forgetting that "Union " is strength." There is one point over which certain of the gas companies must not be misled. There are, we understand, local authorities who are parties to the agreement who are actually petitioning against the Bill. No reliance, however, must be placed upon this anomalous condition of affairs, as these local authorities may withdraw at any time. Their very action in opposing shows the weakness of their case; for they can scarcely go with clean hands before a Committee, and assert that they object to have something they have illegally done being made legal. The absurdity of such a position is too plain to need words to enforce it. If the gas companies concerned remain quiescent now that so much has been gained for them through the Standing Orders Committee, it will be a pity, the effort will have been wasted, and no one other than parties to the agreements will be represented before the Select Committee.

The second illustration also involves an important question of principle, which, if neglected when brought forward, might be extended with considerable ill-effect upon all gas companies. The London and North-Western Railway Company have a Bill in Parliament this session; and in this —following upon certain electrical powers that the Metropolitan District Railway Company secured last year—the promoters proposed to go much farther. They contemplated taking power to construct a generating-station anywhere on their railway, and to enter into comprehensive arrangements for receiving or giving a supply of electricity in bulk. This was merely the thin end of the wedge. Once the Company had established their right to generate for themselves or to receive a supply in bulk, their next proposal was to obtain authority to do business in the disposal of their surplus energy. This they intended to do by taking powers to enter into agreements to supply energy to manufactories or other premises either for power or lighting on the route of the railway. A number of gas companies lodged petitions against the granting of these powers; and indeed they were the only formidable petitioners, because the provision was so hedged about with safeguards for local authorities and existing suppliers of electricity that there was no need for their opposition. The gas companies, however, were left out in the cold altogether; and, if the electrical clauses in the Bill had succeeded, they would have had to face this competition of electrical energy, supplied by a railway company, all along the line. The result of the gas companies' petition was that the Railway Company withdrew from their measure this power regarding business in electric current with the owners of premises abutting on their property.

This, and the previous illustration, show how vigilance is rewarded; whereas supineness may, sooner or later, bring its deserts. Once more, we express the hope that full advantage will be taken, by the co-operation of the gas companies operating in the areas affected by the National Electrical Construction Company's Bill, of the facilities secured for them last Wednesday from the Standing Orders Committee.

Men and Materials.

THE gas-fitter and his work are to-day receiving in many quarters in the gas industry the consideration that the importance of both demands. It is safe to say that no man possesses more power than the gas-fitter in producing success in the house of a consumer, and thus giving satisfaction, or just the reverse. He can make or mar business; and therefore, though his calling may not be placed high in the category of employments, its importance is unassailable. We will not talk on this occasion of the schemes that are being put forward to modernize the man and his ideas in accordance with the multi-charactered work that is required of him to-day. There is before us a paper which Mr. W. L. Westbrook read last Saturday before the Midland Junior Association, and which brings one into intimate contact with the work of the fitter, with the materials he uses, and with the way they should be employed. At the very head and front, however, of this paper we get the importance of training impressed; but the training of what?—men with brains, and, we would add, men who know how to use their brains. We have met good-brained men whose nullity in practical and commercial affairs has been as striking as the brilliance of their gifts in other directions. It is little use training men without brains, and usable brains, for the work of gas-fitting. Better is it to tell them plainly they have mistaken their vocation, and that they had far better look

about for another calling for which they are better adapted. Good material is required in the man, just as for the work upon which he is to be engaged. The day has passed, we should hope, when it is necessary to enforce the importance of the fitter and his work, and of his training; for most gas suppliers know from experience the several ways in which the incompetent man can, and does, affect the interests of a gas undertaking.

In the paper the writer advocates, and properly, that gas suppliers should undertake fitting-up work right from the outset. This would give them a larger control over the men employed, and would enable a gradual introduction of more commonsense fitting than one finds in many modern houses wherein the work is carried out by the builders' fitter, and which work, as often as not, means future trouble for the vendors of gas. Take some of the modern-built houses, and look into the question of the carcassing. Unless the gas suppliers have tendered advice or had supervision, the calibre of the piping used is frequently found to be exactly the same as it was when the sole use of gas was for illumination purposes; and the old system of location of points of lighting is carried out, as though in this respect the last word was said thirty or forty years ago. With the extending use of gas in domestic service—for cooking, heating, ironing, hot-water supply, and so on—the small-bore pipes quickly become inadequate for both volume and pressure. Trouble arises. Again, as to the situation of points of lighting. Often these are not in the best positions for securing the greatest serviceability and safety. Some modern houses inspected quite recently had—this merely as an example—in the bedrooms, points for bracket lights on both sides, or one side, of the windows—the same old fashion. If the annual reports of the Metropolitan Fire Brigade are studied, this placing of gas-burners is found to be a most luxuriant cause of curtain destruction, through the wind blowing the curtains on to the lighted burners. Now that inverted lights are becoming so popular for domestic purposes, a fancy double-armed pendant (from the ceiling) before the dressing-table, after the manner of modern electric lamp equipment for bedrooms, is an excellent substitute for the old-fashioned manner of bracket-placing at the sides of the windows. This by the way, however, for the purpose of illustration, following up Mr. Westbrook's suggestion that gas suppliers should, for their own future peace of mind and the protection of the interests of their particular undertaking, secure the work of piping houses or other premises, or, at any rate, the supervision of the plans for fitting-up.

In passing, there is in the paper a plea to manufacturers for greater uniformity in the matter of fittings connections. The more this matter is studied from the labour point of view, the closer we shall get to the best economical conditions. It was one of the points made last week in dealing with the mutual interests of gas suppliers and makers of gas-fires in contributing to success, on the one hand, by a greater uniformity in the composition, specific gravity, and pressure of gas, and, on the other hand, by the production of fires suitable for the gas-supply conditions under which the fires and other heating appliances will be used. In dealing with fittings, there are minor points upon which there is, and will be, disagreement with Mr. Westbrook; but, on the whole, his views as to fittings and methods of carrying out the work of installing burners, fires, cookers, &c., are those that are commonly approved. We are with him particularly in his condemnation of cheapness at the expense of quality. Conformable with purpose, the best types of anything are the cheapest in the long-run. Good service and long life, with the minimum of trouble, are the contributors of success and satisfaction. There is one point upon which we should not like Mr. Westbrook's remarks on the subject of internal leakage to go forth among our competitors unqualified. In speaking of the testing of internal fittings, he says that, with good workmanship and good material, a water-gauge should remain stationary at 8 inches to 10 inches. It is added: "That an *ordinary* installation will not stand this test is "rather discreditable to the gas industry. Why this leak-"age?" That is rather a broadly-expressed condemnation, the applicability of which in some districts would (and properly) be disputed. The fact that a gauge may not remain exactly stationary may be due to other physical causes than leakage. However, where leakages are actually responsible for loss, cheap and badly-wearing material and fittings or else indifferent workmanship are responsible; and these are matters subject to remedy. We do not like the insinuation, as to leakages perpetually proceeding in houses, that appears to be conveyed by the word "ordinary." We think that on reflection Mr. Westbrook will revise this statement, as it is a pity that false impressions, through probably a slip in the manner of statement, should be allowed to get abroad, to the detriment of the industry. However, the message of the paper is that the best men, the best work, and the best materials and fittings are safeguards to the business of the gas industry. So we all think; but unfortunately all do not act up to their recognition and belief.

Technical Officers' Remuneration.

It is a reproach to some of our local authorities that, as the work and services of certain of their technical officers increase, so the notions of the former as to the remuneration the work and services should receive make a serious backward movement. We cannot understand why the ratio of the one to the other tends to inordinately widen, unless it be due to the changing composition of the governing bodies. In the gas industry, we have protested against the sickly looking pay that is sometimes offered to technically trained assistants by the managements of gas undertakings—pay that many clerks would reject with contempt. More than once we have been asked to refuse to insert advertisements that propose salaries that are a positive insult to the technically trained. But such a course would not be of much avail in stopping the evil. On the contrary it would create bad blood, and would put us in an invidious position. A more effective way is for assistants with any self-respect to withhold their applications. In the work of trying to reform those local bodies who assess technical service at so low a figure, co-operation can do more than is possible by individual effort.

The Institute of Chemistry have supplied an example of good procedure in the recent drastic course they have taken in dealing with this matter; and exposure of the kind that we have illustrated here will, in our opinion, inflict some heavy blows upon those who try to exact an enormous amount of technical service for altogether disproportionate pay. Members of local authorities who have any personal regard will not care to be among the parties who are arraigned at the bar of public opinion in the fashion that the Council of the Institute of Chemistry have adopted. The Metropolitan Borough Councils of Lambeth and Wandsworth and the County of Antrim have been advertising for public analysts; and, in the daily papers, advertisements have appeared from the Council of the Institute conveying their opinion that the terms and conditions offered in these cases are not compatible with the adequate and complete execution of the duties of the offices, and that it is contrary to the public interests that appointments should be made on the terms suggested. The Council have gone further than give public expression to this opinion. In the same advertisements, they inform the fellows and associates that they view with considerable disapproval the application for, and the acceptance of, the appointments referred to on the terms and conditions named. Members who are candidates for the positions are advised to withdraw their applications; and members of the Institute are asked to refrain from giving testimonials in support of any candidate applying for the appointments. The Council have taken a dignified action, which is fully justified. It is not their duty to sit idly by, and see the profession slowly degraded, on its official side, by the mean estimates of non-technical men as to the value of technical and responsible work.

Take Lambeth as a case in point. The Borough Council were offering £500 per annum as remuneration for a public analyst. The Council called this sum "remuneration"—remuneration for what? Services only? Mark this: It was to cover not only the examination of a definite number of samples, but the provision of a laboratory, with apparatus, chemicals, and assistance! In this £500, there was, of a truth, the "minimum wage." Local authorities should do their part in creating and keeping up the supply of technically qualified men, by making public service attractive to the best intellects. But the way they are going to work is the one that will bring to the public service only second-rate men, or else men who will go about their work in a perfunctory manner. Moreover, local authorities; in offering such remuneration with conditions that make the position a paltry one, are not contributing to maintaining a high standard of integrity. This was one of other aspects of this matter that Dr. George Beilby, the retiring President, presented in

an address at the recent annual meeting of the Institute. He strongly urged upon municipal bodies to realize that the proper administration of important work and concerns could not be expected unless they invited to their service the best men. What applies to analytical chemists applies also to other responsible technical officers of local authorities. We should be very glad to see the strong attitude taken up in this matter by the Institute of Chemistry followed by other representative organizations. It is certain that such action—and especially when directed to properly remunerating and encouraging technical assistants (who are individually more helpless in this matter than their superiors in responsibility)—would be applauded by all who have at heart the raising rather than the degrading of the status of technically competent officers.

Artificial Daylight.

Those commercially concerned in gas illumination must bestir themselves, or clever men (the adjective is genuinely employed), with a bent of mind for research into the problems of light, will carry on all their investigations more or less to the exclusion of incandescent gas-lights, and limit themselves to electrical sources of illumination. We have in view particularly the work that is proceeding in devising filter-screens for reproducing, by means of sources of artificial light, a light that is the equivalent of normal daylight, the standard for which is generally accepted by investigators as a white cloud-light. If this matter is neglected for incandescent gas lighting, the chances are that electric lighting, with filter-screen equipment, will be urged upon all those who work in colours in studios and factories, and for shops and other places where it is desired that the natural colours of (say) fabrics and pictures shall be properly presented by artificial as well as by day light. Readers will likely recollect that the subject of the relative efficiency of lights in connection with the presentment of colours in their natural tones came before the Illuminating Engineering Society lately in a paper by Mr. T. E. Ritchie, and that the use of light-filters was referred to in the discussion [*ante*, pp. 202, 215]. Further circulation was given to information concerning the subject at the meeting of the Royal Sooiety of Arts last Wednesday, when Mr. T. Thorne Baker, F.C.S., F.R.P.S., discoursed on it.

In the first paper referred to, Mr. Ritchie submitted the results of photographic tests made to ascertain, within the limits of accuracy afforded by this means, the effects upon various colours of different unscreened lights. He did not entirely neglect gas-lights; but he had no means or opportunity of testing what shopkeepers very widely regard as the best light—supplied by the high-pressure gas-lamp—for the purpose of fairly exhibiting the colour of their goods without any accessories in the way of screens. In the discussion of his paper, however, the subject of use of filter-screens and the conversion of illumination to approximately normal daylight was alluded to; but those who had investigated the problem showed they had only dealt with electric lamps. The same with Mr. Baker's investigations; the whole of his work seems to have been carried out with electric lamps, to the entire neglect of incandescent gas-lamps. It may be found—we think it would be found—if research is carried further, that there is less difficulty in transforming gas-light to the equivalent of normal daylight than is the case with the varying spectra of different electric lights. Therefore, there are good reasons for the matter being investigated on behalf of the gas industry; for it cannot be the desire of the industry to be dismissed from any field of illuminating service through an apathetic attitude towards these higher forms of investigation, or through any mistaken notion produced by the limitation of research on the part of those who are at present making study of the matter. Such a research as this would be an excellent one for prosecution at the Leeds University, if the Livesey Advisory Committee can see their way to influence the necessary provision.

There is no question as to the importance of the subject. To many industries in which colours are employed, it means a matter of economy. As Mr. Baker in his paper points out, we require an illumination which must possess the maximum of economy, the maximum of diffusion and distribution, and which must be of a colour required by the dictates of hygiene. Then he mentions that he has "come "across many instances in this country where industrial "work has been hampered through the use of artificial "light—ideal, perhaps, from the engineer's point of view, "but very deficient from the physicist's point of view." One example of this was that of a factory where the printing of wall papers was carried on; and for this factory Mr. Baker devised a special lamp, in which metallic filament lamps, with a suitable light-filter, were used, which gave filtered light spectroscopically equivalent to daylight, so that uniform colour matching and accurate selection of dyes and pigments were ensured. Manufacturers and others working in colours will not be slow to grasp that there is economy for them in the speeding-up of their works and increasing the output if they can by new devices escape from the limitations formerly imposed upon them by the necessity for matching and working in colours during the hours of daylight. The fact that the use of the filter-screens means a loss of light efficiency is a small matter that need not be considered alongside the loss occasioned by the necessity for holding work in abeyance through the absence of means during hours of darkness for reproducing normal daylight by artificial illuminants. As already said, it is our belief that investigation would show that the problem with incandescent gas-light would not be at all a difficult one, and that this, with the cheapness of the light source, and its steadiness and reliability, would combine to strongly recommend it for purposes of colour matching and examination in factories, shops, studios, and elsewhere when daylight fails.

British Commercial Gas Association.

The working machinery for the Association, it will be seen from the report in another column, has now been practically all assembled; and offices, separate from, but in the neighbourhood of, those of the Institution, have been taken at No. 47, Victoria Street. This fact and the appointments that have been made will give the Association better status and a more self-contained embodiment than would have been the case if it had continued to have the semblance of a subsidiary limb of the Institution, with quarters in the same offices. As to the executive of the Association, the most important appointment that has been made is that of Secretary to the Association; and the honour has fallen upon Mr. W. M. Mason, the Superintendent of the showrooms of the Glasgow Corporation Gas Department. Mr. Mason has a grand opportunity and scope in his new capacity for carving out for himself a high place in the commercial work of the gas industry; and we have every reliance that he will do so, and will thus justify the confidence of those whose choice has fallen upon him for the position. Mr. Mason is a keen defender of the interests entrusted to him; and he is a firm believer in wide publicity as an important factor in competitive business. He certified this in the paper that he read before the North British Association last September, and examples of his advertising work have since been seen in the pages of the Glasgow papers. In congratulating him upon his appointment to a position in which his efforts will count for so much, we wish him the fullest success. Mrs. M. A. Cloudesley Brereton is to be Editor of publications and advertisements. Here, too, will be a responsible position in presenting literature and publications in a suitably attractive form. The General Committee are keeping the matter of funds before gas undertakings, as their operations must be limited to the available subscription.

Laws Affecting Strikes and Lock-Outs.

Though appearing so opportunely, a great amount of time has, of course, been spent by the Labour Department of the Board of Trade on the Memoranda issued last week, prepared from information in the possession of the department relating to the text and operation of certain laws in the British Dominions and foreign countries affecting strikes and lock-outs, with special reference to public utility services. It was in consequence of a number of questions in the House of Commons during the autumn session of 1911, that a promise was made by the Board of Trade to prepare information on this subject; and the result is an interesting volume, which, though it is not claimed to be exhaustive, embodies such particulars as it has been possible to procure without the holding of a special inquiry. The existing state of affairs in this country will, it may be safely assumed, secure an even larger share of attention for this compilation of facts than it would in more ordinary circumstances have enjoyed. The stages through which the various Acts have reached their present form

are briefly indicated; and their salient provisions, together with (when the material is available) their general operations, are described. Under the last head, particulars are given in several cases as to the extent to which strikes or lock-outs have, or have not, been avoided; and an attempt has in some instances been made to indicate the extent to which penalties laid down by the various Acts have been imposed and their provisions enforced. In several cases, however (especially in the section dealing with foreign countries), information has been limited to the text of the measures themselves. It is pointed out that the legislation with which the return deals varies greatly in character; and changes are still in progress. The differences in character turn largely on general scope and aim, and more specifically on the machinery set up under the different Acts, on the penalties they impose, and as to their bearing on what are known as the "public utility services." This latter expression has, it appears, no exact definition. Primarily, the services of water, gas, and electric lighting, and those of public locomotion, transport, and communication are included; but, when recognized at all, the precise interpretation and application of the term vary greatly in the different Acts. It may be stated that the return extends over about 150 foolscap pages; and that its usefulness is increased by the inclusion of a subject-matter index.

Some Points from the Return.

Although much information is, it is pointed out, given as to the operation of the Dominion legislation, no general conclusions as to its efficacy can well be drawn. The records illustrate the wide application of the various laws; but an exact opinion as to the extent to which lock-outs or strikes have been prevented by them would require more exhaustive and more intimate knowledge than is available as to the circumstances under which the reference of disputes to the various Acts was made, and as to the extent to which demands of those moving for such reference have been either conceded or refused. The records of actual contraventions of the Acts are incomplete; and official returns of lock-outs and strikes, whether or not involving infringements of the Acts, are not systematically made. Then, again, as regards the responsibility for the enforcement of the Acts there is also some obscurity. Among foreign countries, there are nine in Europe the Statute Books of which have legislation specially designed to avert strikes on the part of those employed in public utility services; and, while varying widely in range and stringency, the laws possess one characteristic in common—the workpeople to whom they relate are in every case placed on a footing different from that of the general body of industrial workers in respect to the right to engage in strikes; this right being either explicitly withheld or else subjected to specific limitations in its exercise. The nine countries referred to are: Russia, Roumania, Holland, Belgium, Italy, Spain, Portugal, the Ottoman Empire, and France. In Denmark and Geneva, too, there is legislation embodying the creation of permanent Courts of Arbitration, equally representative of the interests of employers and of workpeople, and endowed, under certain circumstances, with the powers of ordinary Courts of Justice as regards compelling the attendance of witnesses and the production of relevant documents. In the United States, special measures for safeguarding public utility services from interruptions due to strikes and lock-outs have from time to time engaged attention; but the laws specially enacted for this purpose are concerned solely with the railway service. It is added that the question as to how far (if at all) any of the foreign laws referred to as involving limitations of the principle of freedom to concert for the purpose of suspending work have, in practice, prevented the occurrence of strikes, is one as to which no general conclusions can safely be drawn from available data, nor does it appear that in any of the countries concerned the authorities have themselves attempted to formulate any conclusions on the subject.

Smoke Abatement Exhibition.

The information given in another column will show that gas applications are to receive a solidly interesting and educative demonstration at the forthcoming Smoke Abatement Exhibition at the Agricultural Hall. The Committee who organized displays at the Japan-British and Coronation Exhibitions have taken up the matter of promoting a Gas Section, and the Gaslight and Coke Company have joined forces. The exhibition is one of the many efforts that are being made to expedite the annihilation of the smoke nuisance; and therefore the gas exhibits will exemplify—and exemplify only—the many purposes for which gas now displaces solid fuel. Seven firms manufacturing gas-heating appliances will be taking part in the section; and their appliances will show there is not a purpose for which heat is required in the dwelling-house or other premises that cannot be met by them, and the same in a multitude of industrial operations. What with the display, cookery demonstrations, and lectures, there should be a very full time at the Agricultural Hall during the run of the exhibition. There will be an opportunity of seeing assembled the competing heating appliances of the electrical industry; and perhaps our competitors would like a few friendly contests—say, in the matters of temperature and time efficiencies. These would add interest to the occasion.

Parliamentary Committees.

Committee work starts to-day at Westminster; and right at the outset there will be interest in it, through the early appearance of the South Suburban, Bromley, and West Kent Amalgamation Bill. This measure is in a group of Bills that will be first dealt with by the House of Lords. There does not appear any strong antagonism to it. The authorities, we believe, recognize the potentialities of the scheme in the matters of economies and thus cheaper service; but they are putting in an appearance in order to secure out of the changed conditions all the advantage they possibly can for their areas. But we may be sure the promoting Company have gone the full length of the concession they feel at the moment justified in making. The local authorities must recognize that there cannot at this stage be any conclusive gauge of the possibilities of the project; but the consumers and the ratepayers of the whole area are safeguarded by the sliding-scale provisions under which the Company work. The Wandsworth Bill has not, at the time of writing, been allocated to a Committee; but it is in the list of Bills waiting for grouping. A Committee of the Commons meet to-morrow, and, as will be seen from the "Parliamentary Intelligence," they have a number of Gas and Water Bills with which to deal. The interesting measure—the Gas Companies' (Benefit Funds) Bill—promoted by the Brighton and Hove, St. Albans, Maidenhead, Lea Bridge, North Middlesex, Southgate, and East Cowes Companies, has provoked the opposition of the Brighton Corporation. Several of the other local authorities concerned have blessed the Bill, and wished it every success; while others feel that the beneficent purposes proposed to be served by it in respect of sickness, old age, and death of workmen are not such that they can conscientiously offer any objection. But the Brighton Corporation—the largest and most influential local authority of all concerned—are opposing. On what pretext? That, the Brighton Gas Company being a sliding-scale one, the application of funds for workmen's benefit would assist in deferring the reduction in the price of gas. All we need say is that those who induced the Brighton Corporation to take this step ought, before the matter is through, if opposition is persisted in, be made to feel the undignified character of their action. The Brighton Corporation had a severe defeat in the two Houses last time they attacked the competitor of their Electricity Department; and if it were possible for them to have a worse defeat on this occasion, we should, under the circumstances, wish it for them.

Free Carbon in Tar for Road Purposes.

In the "Editorial Notes" in the "JOURNAL" for the 27th ult., some comments were made on the paper by Messrs. Warnes and Southerton, on "Coal Tar and Some of its Products," read before the Midland Junior Gas Association. In connection therewith, the question of the quantity of "free carbon" allowed by the Road Board in their specification for tar was discussed; and the opinion was expressed that "a fairly liberal extension" of the limit was called for, especially with respect to the tar produced in the London and North-East coast districts. The Board have now issued a memorandum in which they state that, representations having been made to them as to the difficulty of obtaining from gas-works in and about London and in some other districts tar or pitch which complies in percentage of free carbon with their specifications for pitch and for tars Nos. 1 and 2, they—as a temporary measure, in order to allow time for arrangements to be made for the supply of tar and pitch containing no more than the specified percentages of free carbon—have, on the advice of their Advisory

Engineering Committee, decided to modify them as follows: "In tar No. 1 (Specification No. 4) the percentage should not exceed 20 per cent.; in tar No. 2 (Specification No. 5) the percentage should not exceed 21 per cent.; in pitch (Specification No. 6) the percentage should not exceed 31 per cent." These modifications will be operative until Dec. 31, 1913. The Board say: "It should be distinctly understood, in contracting for the purchase of tar or pitch, that the value of the material for road purposes lessens with the increase of the proportion of free carbon which it contains. A fair estimate would be that each 1 per cent. of free carbon in excess of the percentages mentioned in Specifications Nos. 4, 5, and 6 lessens the value to the extent of from 5 to 7½ per cent. of the price."

Municipal Electric Wiring Bill Not Dead.

The "Electrical Times" has been making inquiries as to the correctness of our assertion, on the strength of a parliamentary document recording the progress of Bills in Parliament, that the measure introduced by the Incorporated Municipal Electrical Association for conferring wiring and other powers on municipal electricity supply undertakings has been dropped. Our contemporary states that it has received "a letter from Mr. H. Faraday Proctor pointing out that this is not a fact." On the face of the Bill, there are the following, among other, particulars: "Electric Lighting—A Bill to give increased powers to local authorities with regard to electric lighting, and for other purposes connected therewith. . . . Presented by Sir Howell Davies. . . . No. 374." In an official list of Bills before us, there appears this line: "Electric Lighting [No. 374], Sir Howell Davies, Second Reading [*Dropped*]." The heading to the column in which the words "Second Reading" appear is "Progress." Presumably, in view of Mr. Proctor's statement, this merely means that the motion for second reading was "dropped." If this is so, then the official mode of expressing the position is a clumsy one. In the lists of Bills published on March 4 and yesterday, the measure does not appear; so that apparently up to the present time the motion for second reading has not been revived. But we may take it from Mr. Proctor that the Bill is not dead, but sleeping.

Gas at the International Smoke Abatement Exhibition.

In view of the approach of the date for opening the International Smoke Abatement Exhibition, we are pleased to learn that the Committee who dealt with the gas exhibit at the Japan-British and Coronation Exhibitions at Shepherd's Bush have decided to spend on the work of securing a good representation for gas at the Agricultural Hall the balance of the funds subscribed for the purpose of those exhibitions; and that the Gaslight and Coke Company have joined forces with the Committee, with whom also are co-operating seven firms of manufacturers—viz., the Davis Gas-Stove Company, Limited, Messrs. Ewart and Son, Messrs. Fletcher, Russell, and Co., Limited, the Parkinson Stove Company, Limited, the Richmond Gas Stove and Meter Company, Limited, Messrs. Wilsons and Mathiesons, Limited, and Messrs. John Wright and Co., Limited. The exhibit will be divided into three sections. The first will show three model kitchens, one for a prepayment meter supply, one for a good-size house, and the other for a restaurant; the second will be devoted to gas-fires and heating appliances, and will consist of five groups, each of four fireplaces, in which the gas-fires will be shown in action; and the third will comprise two model bath-rooms and an exhibit of gas-furnace and other industrial heating appliances. The Company are co-operating with the exhibition authorities in regard to cookery demonstrations and competitions; and so there is every prospect of gas being kept thoroughly well to the front at the exhibition.

Obituary.

On the 1st inst., Mr. John Dennis, J.P., of Brixwold Cockpen, died, aged 70. At the funeral service in the house his aged mother attended, as also a large number of the friends of the deceased. Mr. Dennis went to Scotland from Lincolnshire nearly 50 years ago, when bricklaying was practically unknown there, and has since built nearly all the large factory chimneys in the neighbourhood and the shale-oil retorts and works around Edinburgh. He has also sent men to many of the over-seas dominions to instal oil-works similar to those in use in Scotland. He was Chairman of the Dalkeith Gas Company, and a Director of the Penicuik, Lasswade, and Loanhead Gas Companies. Mr. Dennis had done much retort-setting in past years, and was connected with the late Mr. William Young in many of his projects. He was much respected by all with whom he came in contact for his hard-headed sagacity and business capacity, which had enabled him to amass a considerable fortune.

PERSONAL.

At the meeting of the Institution of Civil Engineers last Tuesday, Mr. Herbert Moyes, B.Sc., of the Nine Elms station of the Gaslight and Coke Company, was elected an associate member.

Mr. W. Arnott, the Manager at the Cape of the South African Lighting Association, who (as has already been intimated in the "Journal") recently left for a visit home of some months' duration, arrived in England last Saturday week, and is paying a round of visits to his friends in the Old Country.

Professor Harold B. Dixon, who has filled the Chair of Chemistry in Owens College and the Victoria University of Manchester for a quarter-of-a-century, was, in honour of the fact, entertained at dinner at the Grand Hotel, Manchester, last week by past and present students of the Chemical Department of the University. Professor Dixon was also presented with his portrait in oils, as a souvenir of the occasion, together with an album containing the names of the subscribers.

The many friends of Mr. John F. Simmance, the Managing-Director of Messrs. Alexander Wright and Co., Limited, will be sorry to learn that he has been unwell for some little time, and will, we are sure, join with us in wishing that the cruise on which he started last Thursday, accompanied by his wife, will be the means of completely restoring him to health. His present arrangements are to spend some little time in Egypt, and then steam down the east coast of Africa and through Natal and British South Africa. He then proposes to visit Australia and New Zealand; and from that point his movements will be uncertain.

A wide circle, not alone confined to Scotland, will be glad to learn of the honour conferred by the War Office upon Major O'Connor, who has been promoted to the command of the Forth Royal Garrison Artillery, on the retirement of Lieut.-Col. J. M'Niel, V.D. Major O'Connor is the son of the late Mr. John O'Connor, R.I., A.R.R.A. He entered University College, London, to study civil engineering. On the amalgamation of the Phœnix and South Metropolitan Gas Companies, he entered the service of the latter as an Assistant-Engineer. He next obtained the appointment of Assistant Engineer and Manager of the Bombay Gas Company, and spent five years in India. He was appointed one of the engineering professors at the then newly-formed Technical College there, and was elected a director of the Sassoon Mechanical Institute. It was while in India that he became associated with the Volunteers. On coming to Edinburgh, Mr. O'Connor joined the firm of James Milne and Sons, Limited, and had charge of the gas engineering department; and since leaving the firm, he has acted privately as Consulting Civil Engineer. Mr. O'Connor is lecturer at the Heriot-Watt and Glasgow Technical Colleges on subjects connected with gas; and he was instrumental in founding the Eastern Section of the Scottish Junior Gas Association.

At the dinner given at the Savoy Hotel last Friday, by the Chairman and members of the Streets Committee of the Corporation of London, to the Lord Mayor and Sheriffs, as noticed elsewhere, a testimonial was presented to Mr. Josiah Gunton, the ex-Chairman of the Committee, who had held office for two consecutive years. In proposing his health, the present Chairman, Mr. G. Gordon Stanham, said that during Mr. Gunton's chairmanship many important matters had been considered; one of the most important being that of lighting the streets. It would be remembered that the Committee visited some of the principal cities on the Continent, and eventually were able to place a complete scheme before the Court of Common Council; and it had been carried out under the able guidance of Mr. Gunton. By it, they would secure an increase of light, and between £6000 and £7000 of the ratepayers' money would be saved. On behalf of the Committee, he asked Mr. Gunton to accept a silver salver as a slight evidence of their esteem and goodwill. During the two years he had been in office he had shown marked ability, and gained the esteem and affection of his colleagues. He was only voicing their wishes when he expressed the hope that Mr. Gunton might be spared for many years to render valuable service to the Corporation. Mr. Gunton in reply, remarked that by July next the whole of the City would be lighted by centrally-hung gas and electric lamps of double the power at present existing, and, Mr. Stanham had stated, at a saving of some £7000 per annum on the present contract.

Dinner and Presentation to Mr. John Wilkinson.

At the Great Northern Hotel, Bradford, on Wednesday last, a complimentary dinner was given to Mr. John Wilkinson, the Engineer and Manager of the Nottingham Corporation Gas Department. A number of gas engineers connected with Yorkshire undertakings were present, as well as representatives of the principal gas industries. The toast of "Our Guest, Mr. Wilkinson," was proposed by Mr. Charles Wood, the Gas Engineer to the Bradford Corporation, and supported, among others, by Messrs. Broadhead, Richmond, Ellison, and Brearley, who spoke of the good qualities of Mr. Wilkinson, and reviewed the excellent work he had done for Yorkshire at Drighlington, Sheffield, and Halifax. While it was generally admitted that Yorkshire had lost one of the leading men in the gas profession, they at the same time rejoiced that Mr. Wilkinson had been appointed to so honourable a position as that of Gas Engineer at Nottingham. Mr. Wilkinson, in his reply,

thanked the speakers for the way in which they had honoured the toast, and for all the kind words they had used. He had always been a great believer in practical training; and, in his opinion, the man who started in small works and was not afraid of work, who was always ready for gaining knowledge, and had any ambition, was certain to improve his position. He was sorry to leave Yorkshire and all his friends there; but he hoped, if he had health and strength, to still uphold the dignity of the gas profession, and show in the important city of Nottingham what a Yorkshire training could do. During the proceedings, a beautifully illuminated address, subscribed for by 44 members of the Yorkshire Commercial Section of the Manchester District Institution, was presented to Mr. Wilkinson by Mr. Wood. It was as follows:—

> We, the undersigned members of the Yorkshire Commercial Section of the Manchester District Institution of Gas Engineers, hereby offer our heartiest congratulations to Mr. John Wilkinson, Engineer and Manager of the Halifax Corporation Gas-Works, on his appointment as Engineer and Manager of the Nottingham Corporation Gas-Works; and desire to tender our best wishes for his success in his new sphere of labour. We also wish to record our appreciation of his services to our Commercial Section, to which he has ever been ready to give the benefit of his knowledge and experience. While regretting his departure from our midst, we feel that the Nottingham Corporation will have in Mr. John Wilkinson an official of wide experience, ability, and tact, and that what is our loss will be their gain.
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> CHAS. WOOD, President.
> FRED. H. PICKLES, Secretary.

Presentation to Mr. David Vass.

Mr. David Vass, the recently appointed Engineer and Manager of the Perth Corporation Gas-Works, was the recipient of several handsome gifts on Friday night, on the occasion of his departure from Airdrie. The function was attended by numerous representatives of the gas profession. After supper, Bailie Goldie, J.P., who presided as Convener of the Gas Committee, proposed the health and future prosperity of Mr. Vass. He was delighted, he said, to see such a large and widely representative gathering demonstrating to their friend and guest the very general respect in which he was held. For some years he (Bailie Goldie) had been closely associated with Mr. Vass in the conduct of the Airdrie Gas-Works; and the longer he had known him the greater had grown his trust and regard. Mr. Vass had faithfully trodden the path of honour and integrity. He was modest and extremely reticent, but distinctly progressive; and, fortunately for them, he had been possessed of an ability and intelligence which had wisely directed each forward step. His methods were not meteoric, nor were they those of the optimistic "swelled head;" but quietly and unobtrusively he "got there" every time. Bailie Armour, in making the presentation to Mr. Vass on behalf of the Town Council of a gold albert chain and a dressing case, remarked that Mr. Vass took over his duties twelve years ago, and found the works antiquated and insufficient for the town's requirements; but under his supervision they had been modernized, and more than doubled in size, while the holder capacity was increased by four times. Notwithstanding the cost of the purchase, and the large capital expenditure incurred since the Corporation acquired the gas-works, the price of gas had been reduced from 3s. 4d. to 2s. 6d.; and the loss from leakage had been reduced from 11 per cent. to about 8 per cent. Mr. R. D. Hunter, Cashier at the works, then made the presentation to Mr. Vass—on behalf of the workers and many outside friends—of a roll-top desk, and a solid silver kettle and stand for Mrs. Vass, whom he said they had all learned to love and respect. Mr. Vass had always endeared himself to the whole of the staff by his kindly and considerate dealings with them at all times. Being a prominent, though very unassuming, member of the gas profession, Mr. Vass had had many honours thrust upon him, chiefly on account of his pioneer work in connection with gas purification, which had earned for him a world-wide reputation. As a result of the adoption of his new method, the cost of purification had been reduced to a mere fraction of what it used to be—resulting in the saving of thousands of pounds to the works adopting it. Mr. Vass was President of the Waverley Association of Gas Managers in 1895, and President of the spring meeting of Scottish Gas Managers in 1909-10—the only one to hold that position for two years in succession. For a second time he was elected a member of the Council of the North British Association of Gas Managers; and last July he was elected Vice-President of that Association. He was also President of the Western Commercial Section of Gas Managers. Mr. Vass, in responding, said he felt greatly honoured by such a large turn-out to bid him farewell on leaving Airdrie, and he was specially indebted for the kindly feelings expressed towards him. On behalf of Mrs. Vass and himself he thanked all for their generous gifts. In the course of the subsequent proceedings, ex-Provost Knox, J.P., on behalf of the "Airdrie" Lodge I.O.G.T. (the largest in the world), presented Mr. Vass with a dressing case as a memento of their appreciation of his labours in that organization.

The next meeting of the Illuminating Engineering Society will take place to-day week (the 19th inst.), when papers on the lighting of printing offices will be read by Mr. F. W. Goodenough (of the Gaslight and Coke Company) and Mr. Justus Eck (of the Union Electric Company).

ELECTRICITY SUPPLY MEMORANDA.

The Good Samaritans—The Economical Use of Coal—The Frailties of Public Electric Lamps—Blemished Scoring—Guarding Life from Electrical Attacks—Hope without Confidence.

SOME of our electrical friends who felt themselves in a very strong position at the beginning of the coal struggle followed the example of certain gas companies who suggested, through their advertisements, to all who are not patronizing them at the present time, that they were prepared to befriend them in the matter of the provision of heat and power during the trouble. The electrical papers patted the central station engineers on the back for their business acumen, while other central station engineers who had looked at their small coal storage were green with envy, for as we have recently seen from inquiries made by one of our electrical contemporaries, if the coal strike were of long duration several electrical undertakings would before long be in a pitiable plight. In this connection, Mr. M'Kenna, and certain dinners at Manchester and Leeds, have between them induced "Meteor" in the "Electrical Times" to claim that the most economical way of using coal is to turn it into electricity, and then employ the product. We beg to differ from our worthy friend in this connection, and from all those whose words, after dinner at Manchester and Leeds, he has taken as representing "gospel." The importance of economizing our coal supplies has attracted the attention of the Home Secretary; and he is considering whether inquiry should be made as to the prevention of waste in getting coal, and what economies can be effected by stopping waste in the consumption of coal, and by its more scientific use in the production of energy. With one accord, the electricians seem to have held up their hands to draw Mr. M'Kenna's notice to their claim that the stuffing of coal under a boiler, the production of steam, the driving of an engine by the steam, and a dynamo by the engine, is the most economical way of using coal, and the most scientific way of producing energy. Then may the country be defended; for a more wasteful method of employing coal could hardly be conceived—for between the coal stoked under boilers at the generating station and the kilowatts delivered to the consumer, there are temperature losses of considerable magnitude, and the heat units offered by electricity at a price are meagre, and prove the uneconomy.

We have before us the accounts of one large metropolitan electric supply corporation with an immense railway traction load; and the average cost of coal per unit sold works out at 0·30d. As coal last year cost the company in question 10s. 10½d. per ton, it follows that the electricity sold per ton of coal equalled 434 units; which 434 units are the equivalent of 1,492,960 B.Th.U. What a terrible waste is disclosed here between this figure and the 32,928,000 B.Th.U. of an average ton of coal. Now we know of an industry that carbonizes coal in a manner that shows very little waste; so little that in the gas, coke, and tar it produces, there are the corpulent number of (approximately) 28,100,000 B.Th.U. Therefore the margin of temperature loss in the process has been brought down to a comparatively narrow one—that is to say, the gas yield represent about 6,500,000 B.Th.U.; the coke (say) 18,900,000 B.Th.U.; the tar 2,684,000 B.Th.U.—this without reckoning any value for the sulphate of ammonia. Now surely this is a more economical way of using coal than by generating electricity, if we deal with the matter solely from the standpoint of economy. We go further, and point out that the gas and materials representing the 28,100,000 B.Th.U. available in the primary and two secondary products from a ton of coal carbonized in gas-works were sold, according to the latest analysis of the accounts of one large company that we have before us, for a little more than £2—that is to say, from the three sources of revenue, without taking into calculation sulphate and meter and stove rents, the ton of coal produced that amount of revenue. The 28,100,000 B.Th.U. at rather more than £2 strikes us as being somewhat better value to the public than the 1,492,960 B.Th.U. represented by the 434 units of electricity sold by the electricity corporation whose figures we have taken as illustrations, and for which units, at the average price of 2d. per unit, they received £3 12s. 4d. That is very dear energy on a temperature assessment. We rather incline to the view that a large amount of information is needed to bridge these facts, so as to substantiate a superiority in the economical use of coal by the electrical industry. In the gas industry we claim that, in view of the value of the products obtained by the methods of carbonization employed, we do much better than any other industry in the matter of the productiveness of value from a ton of coal.

Human nature finds delight in having demonstrated the defects of competitors. We have noticed that this trait of human nature is strongly developed in our electrical competitors. If a single gas mantle is found in a decrepit condition in a public lamp, it is something over which to go into ecstasies; and it is held up as the common condition of the whole genus. Truth is suppressed by the elation occasioned by the one wreck among a host doing duty in a state of high efficiency. The larger troubles from which electric lighting suffers are not brought into comparison by our electrical friends. The collapse of an entire electrical service, and the extinguishing of the whole of the public lamps, lights in shops, places of public entertainment and meetings, railway stations, and private residences that are committed to the untender mercies of erratic electricity supply are not made so much of by electricians as is the single defective lamp of the competitor. It

does not, however, require a complete collapse of the electricity supply to produce trouble with public lamps. Something may go wrong on a single circuit that may affect all the lamps or perhaps one or two on it. This sort of thing has been frequently noticed. The other day in the Shoreditch County Court a taxi-cab driver sought to recover ten guineas for personal injuries caused by his cab colliding with an unlighted electric-light standard in Stoke Newington. This unlighted standard was situated in the middle of the road—a most dangerous situation for any recalcitrant lamp after dusk. In addition to the driver's action, the two passengers have commenced proceedings against the owners of the cab and the Borough Council. We will not comment on the matter under the circumstances, but may just point out the nature of the defence to the taxi-cab driver's claim. It was contended that there was nothing binding on the Council to light an electric standard. The lamps are, it was mentioned, erected in groups of nine. The confidence that the Electricity Department has in its own lighting is seen from the statement that "a special scout" was out on the night in question; and he discovered that three lights had gone wrong. On investigation, he found an earth connection with the lamp of which complaint was made. On disconnecting this from the cable, the other lights became all right. The lamps, it was further pointed out, had been erected in accordance with the Board of Trade regulations, which do not say that a man shall stand beside each standard until a light fails. Deputy-Judge Williams considered the action as a most important one, and reserved judgment. But he has since declared in favour of the Council.

Another illustration. If a builders' man does a job in gas-fitting in a manner that no properly trained gas employee would do it, and the result is one to be deplored; if a heavy trolly-waggon passes over the roadway, and causes a depression in a part where the crust is not sufficient to withstand such a weight, and at this point a gas-service happens to be located and gets fractured (through no fault of the gas suppliers), and there is leakage into a neighbouring house, which leakage is neglected by the occupants, or if there is a neglected escape of gas in the house-fittings, and the results are of a regrettable character—all being matters over which the gas purveyors have no control—there is jubilation in the electrical camp. Editorial notes are written on the subject, but it is not the rule for the facts to be all disclosed. It is our business to notice the defects of electricity; but no one can accuse us of hiding the essential circumstances so far as they can be gathered from our electrical contemporaries' own reports, or from the other sources of intelligence. One of our contemporaries, for instance, referred the other day to the suffocation of two servants at Beckenham as having been occasioned by the carbon dioxide from a gas-stove "jet." Observe the reference to "jet" in the singular. That editorial writer did not say that the gas-stove was an outside conservatory one, and ought not to have had connection with the interior of the house; that a builders' man had run the flue-pipe from this conservatory stove up the outer wall of the house, and had given outlet to it and to the products by the register of the coal grate in the servants' bedroom; that the room was kept closed up like an air-tight case; and that one of the servants lifted the register which gave the flue-pipe of the conservatory stove the direct means of discharge into the room. How far did this leader writer give his readers the whole truth of the matter, in stating that these servants were "asphyxiated by the carbon dioxide emanating from a gas-stove jet?" This, to put it mildly, is hitting below the belt.

In electrical contemporaries published at the same time, we find the accounts of how two men lost their lives by touching live electric wires:

An inquest has been held at Middlesbrough on James Woodhouse, who was killed at the Eston Steel Works of Messrs. Bolckow, Vaughan, and Co. Deceased was driving an electric crane. It became necessary to put in a key to a bogey on the travelling portion; and in doing so he forgot to withdraw the main switch, and touching two live wires with his hand, he was immediately rendered unconscious, and died in a few minutes. A verdict of accidental death was returned.

An inquest has been held at Dublin, into the cause of death of Henry Andrews, aged 36 years, who met his death on the previous day at the Corporation electricity works, Pigeon House Fort. The deceased was an erector in the employ of Ferranti, Limited, and was engaged by them on the switchboard and cable work, carrying out a contract. He was standing in front of the switchgear, talking with the Deputy City Electrical Engineer, and touched part of the gear with his right hand. This gear was not alive; but suddenly he apparently reached out his left hand and touched a gear which was alive. He received an electric shock. Artificial respiration was resorted to; but to no purpose. Deceased was a man of great experience. The jury returned a verdict of accidental death.

Only the other week we were recording the death of an electrician who died from shock received through a defective arc lamp; and we know that there are several instances of fatalities on record through receiving shocks with current at 220 to 250 volts, which is the common supply voltage for domestic and general purposes in this country. However, our main point is that, knowing that there is danger from gas mainly through negligence or accident—danger which can be averted by the smell of gas or other warning (such as the feeling of faintness experienced by the servants at Beckenham, days prior to their death, through the boxed-up condition of their bedroom, as stated in evidence), and by heeding the monitions of the sense of smell with which Nature has endowed us—and knowing, too, there is danger from electric shock and wire-fusings (which gives no warning), when such occurrences are referred to by competitors, it is fairer for the whole truth to be told than for indirect and sinister statements to be circulated.

Any layman whose mind has been impregnated by electrical literature with the safe properties of electricity would be rapidly cured of his wrong impressions by reading the revised text of the special rules for the installation and use of electricity in mines which have been issued by the Home Office. He would become converted to the belief that electricity is a dangerous and an elusive fluid that has to be kept from mischief by a wonderful collection of devices, and by constant watchfulness on the part of a skilled person—the doings of which skilled person has to be regularly entered in a log-book, and be, with the condition of his electrical charge, subject to official scrutiny periodically. The use of electricity is prohibited in any part of a mine where, on account of the risk of explosion of gas or coal dust, its use would be dangerous to life. There are rules for notices and returns to the district inspector in regard to existing apparatus, alterations, extensions, and so forth. Succeeding are provisions for notices to workmen; among which is one informing the men how they will be treated in an effort to restore them should they receive an electric shock. Then there are clauses referring to lighting and to fire buckets. Of course, the functions of the Electricity Publicity Committee include the work of trying to educate people to believe they have suffered from some temporary mental aberration in thinking that there has been sudden darkness where there was illumination from electric lamps, and in harbouring the impression that a fire has been caused by a short-circuit. But we see official wisdom provides in these rules that "in all places lighted by electricity where failure of the electric light would be likely to cause danger, one or more safety lamps or other proper lights shall be kept constantly burning." And beyond all this, telephonic or other equivalent means of communication is to be provided for the protection of those working where there is electricity; and fire buckets filled with sand are to be kept at hand ready for immediate use. We know that several shopkeepers who have suffered from the extinction of their electric lights have had their gas-fittings overhauled for emergency purposes. Several tradesmen now habitually use both forms of light. We know, too, how widely hand fire-extinguishers have been advocated where electricity is employed. Then we go on wading through numbers of rules providing for fire-proof construction, heavy insulations, earthing, and fortifications of all sorts around this insidious and wayward form of energy. But with all the marvellous protection provided for, a competent electrician is to have the installation constantly under inspection. In these rules there is ample evidence that, despite the best equipment that technical intelligence can devise, electricity is constantly at work seeking to gain mastery over its custodians whenever a weak point or an opportunity presents itself.

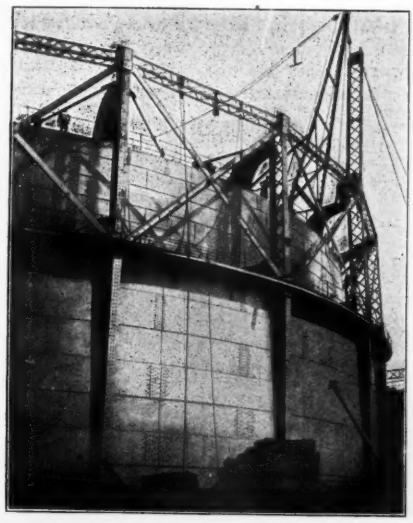
The fact that the City of London is going to secure a large increase in the night illumination of the City streets by the adoption of modern gas and electric lamps at largely diminished cost, is well known. The gas and mantle economies of the modern system of lighting streets by inverted gas-lamps are having material exemplification day by day; and, through this and the new economies of gas production, public lighting can be undertaken by gas suppliers at substantially reduced rates compared with former days. For street purposes, local authorities generally expect some concession from the price charged for gas to private consumers; but the concessions are not much below those charged to the latter. Electricity suppliers, on the other hand, generally come down to power prices for the current used for street lighting, though that lighting is principally needed during the hours of the private peak lighting load. When on to these low charges for current come the costs of carbons, labour, capital, maintenance, and renewal, it is clear that there is not much, if anything, in such contracts for electricity suppliers. The City of London Electric Lighting Company, in their recently issued report, mention that they have had their tender accepted for lighting approximately the same streets as hitherto in the City for ten years, but on a revised scale of rates. The revision of this antiquated scale of rates was sadly needed. But the Company, it appears to us, are somewhat dubious as to how the contract is going to work out for them. The Directors merely say it is *hoped* that the economies which the modern system may render possible will assist in counterbalancing the reduction in the gross revenue due to the revised rates. There is no absolute confidence expressed here; and it indicates how the modern gas-burner has driven electricians into a tight corner where competition exists between them and gas suppliers. A certain recent controversy in our columns also showed clearly the jumpy state of some of our rivals in the matter of competition for shop lighting—one price one day, and an abatement of 25 per cent. or so on the morrow of the contents of the gas tender reaching their ears. This latter is panic competition with a vengeance.

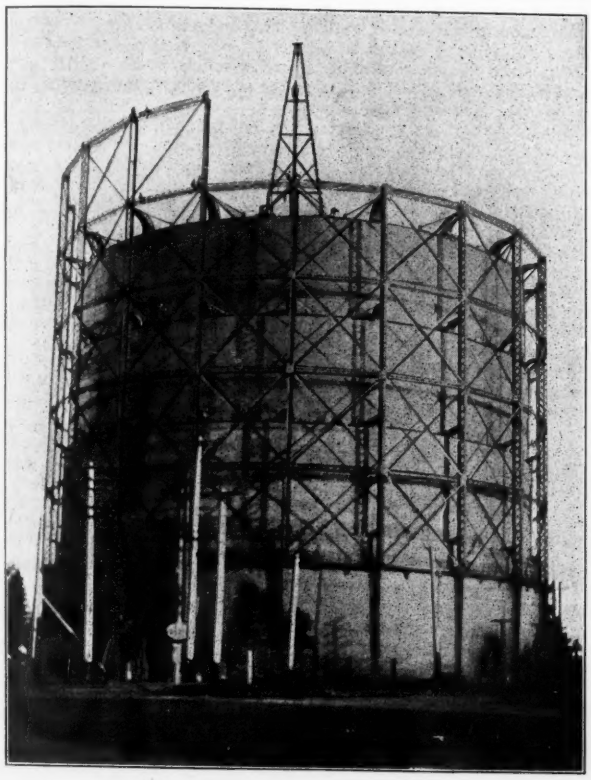
Masonry Dams.—At the Students' meeting of the Institution of Civil Engineers last Friday week, a paper was read on "The Design and Construction of Masonry Dams" by Mr. H. J. F. Gourley. The author dealt exhaustively with the questions of the selection of the site and the setting out of the work, together with the general considerations which govern the design and construction of such structures. The paper was illustrated by a number of lantern slides giving details of dams both completed and in course of erection.

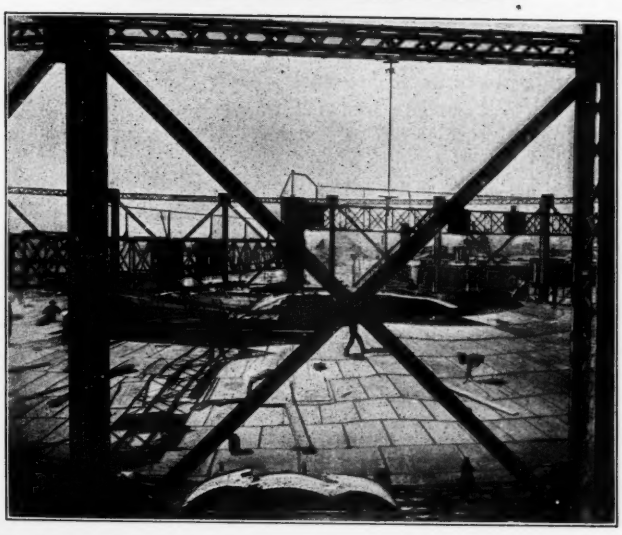
GUIDE-FRAMING OF A GASHOLDER.

Mr. E. F. Miller's Design.

In the "Journal" for the 30th of January (p. 283), we gave the principal portions of an article contributed to "Engineering News" by Mr. E. F. Miller, of the Camden (N.J.) Iron-Works, on the above-named subject. Since its publication, the author has sent some photographs of the guide-framing of his holder (which has stiff horizontals and tension diagonals); and, as promised last week, we reproduce three of them. Mr. Miller says the general design was "developed as being economical in material and fabrication and erection, giving satisfactory economical results at least expense."







EXHIBITION OF GAS-HEATING APPLIANCES AT READING.—[See next page.]

GAS APPLIANCES DEMONSTRATION AT READING.

In another part of the "Journal" will be found an account of a special display of gas-heated appliances for trade and industrial purposes held last week in the workshops of the Reading Gas Company. They were all lent and arranged by Messrs. Fletcher, Russell, and Co., Limited, whose representative (Mr. J. Fentiman) gave demonstrations with the apparatus on view. As mentioned in the account referred to, the lighting of the workshops was very effective. It was carried out by Messrs. William Sugg and Co., Limited, who used for the purpose some of the latest forms of their "Swanley" inverted incandescent lamps. The photograph on p. 723 shows the general arrangement of the exhibition, which was under the supervision of Mr. Douglas H. Helps, Assoc.M. Inst.C.E., the Engineer of the Gas Company.

BRITISH COMMERCIAL GAS ASSOCIATION.

Appointments by the Executive Committee.

The General Committee of the British Commercial Gas Association had a meeting last Tuesday to receive the first report of the Executive Committee, who have been busily engaged upon the work of organization since their formation on the 15th ult. In the absence of the President (Mr. R. G. Shadbolt) through a sharp attack of influenza, from which all his colleagues wish him a speedy recovery, the chair was taken by Mr. F. W. Goodenough.

The names of Sir D. Ford Goddard, Sir Hallewell Rogers, and Mr. Corbet Woodall were added to the General Committee, as a result of the election by the Vice-Presidents as a body of three of their number to represent them on the Committee.

The following appointments were made:—

Mr. Thomas Waddom and Mr. D. Milne Watson to be Trustees.

Messrs. Cash, Stone, and Co., to be Auditors.

Mr. W. M. Mason (now Show-Room Superintendent to the Glasgow Corporation) to be Secretary.

Mrs. M. A. Cloudesley Brereton to be Editor of Publications and Advertisements.

The London Press Exchange, Limited, to be Advertising and Press Agents.

The offices of the Association will be at No. 47, Victoria Street, Westminster—in the next block to that in which the offices of the Institution of Gas Engineers are situated.

Full particulars respecting the future policy of the Association will be circulated to all members at an early date. All that need be said at present is that satisfactory progress is being made. But the Executive, in preparing their programme, are sadly handicapped by need of additional funds. They feel confident, however, that as soon as their programme is fully developed, and made known to the industry as a whole, the necessary support is certain to be forthcoming.

Mr. Charles Carpenter on Industrial Co-Partnership.

It may be remembered that, in connection with the half-yearly meeting of the Labour Co-Partnership Association held in Oxford last November, a conference took place at Balliol College, at which Mr. Charles Carpenter, the Chairman of the South Metropolitan Gas Company, delivered an address which was given in the "Journal" at the time. [See Vol. CXVI., p. 630.] The address has been reprinted in pamphlet form; and, in view of the prominence now being given to industrial co-partnership as a remedy for the prevalent labour unrest, it has been thought desirable to place in the hands of the public some chronological particulars of British profit-sharing which were compiled for Mr. Carpenter's information by Mr. Walter T. Layton, the Editor of the "Co-partnership Journal of the South Metropolitan Gas Company," whose "painstaking labours" in their compilation are acknowledged. They are given as an appendix to the address, and comprise upwards of two hundred notices of attempts in the direction of establishing improved relations between the capitalist and the labourer. Only a few sentences have been devoted to any of the schemes; but references have been given to enable the interested student to obtain further information. Starting with the "Metayer" system of product-sharing between landlord and tenant which became general in England in 1348, there is a gap till the year 1829, when John Gurdon, of Assington Hall, Suffolk, let a farm and advanced capital to some labourers who worked it on co-operative lines. We are then taken right down to the latest adoption of co-partnership in gas-works—by the Aldershot Gas, Water, and District Lighting Company—recorded in our columns only a fortnight ago, and again to-day. These interesting particulars are followed by an alphabetical list of the schemes. The pamphlet has been issued by Co-Partnership Publishers, Limited, of 73, Southampton Row, W.C., at the price of 6d. net.

At the students' meeting at the Institution of Civil Engineers next Friday, Mr. A. E. Gladwyn will read a paper on "The Heat Value of Fuels."

NAPHTHALENE EXTRACTION BY WASHING.

A paper on this subject (by Herr F. Pannertz, the Chemist at the Crefeld Corporation Gas-Works), of which an abstract translation was given in the "Journal" of Oct. 24, p. 247, contained a statement that the author considered that a low temperature of the gas was essential for the efficiency of naphthalene and cyanogen extraction by washing. This statement was based on the author's general practical experience since the year 1903. The abnormally hot summer last year led, however, to a great increase in naphthalene trouble at a large number of gas-works, notwithstanding that oil washers were in use in many cases; but there were no obstructions at Crefeld, either in the distributing system or in the works' mains. These circumstances have led Herr Pannertz to institute a further investigation of the effect of cooling the gas on naphthalene extraction by washing with oil; and he reports the results in a paper in a recent number of the "Journal für Gasbeleuchtung."

Since particulars of the temperatures to which the gas was cooled by the condensers in the several works where trouble was experienced were not in most cases available, Herr Pannertz has endeavoured to establish by laboratory investigations the effect of different temperatures on the extraction of naphthalene from gas, and thus to indicate the conditions in which the washing of the gas for the extraction of naphthalene should be carried out. For this purpose, he made use of the train of apparatus which he had formerly employed for determining the efficiency of different oils for naphthalene extraction. [See "Journal," Vol. CXVI., p. 248.] He added to the apparatus an arrangement by which the washing oil and gas could be kept at a particular temperature. Bearing in mind that in practical working the temperature would be limited to a range of about 32° Fahr. to 122° Fahr., he restricted his investigations to these limits. The washing cylinder containing the oil is in a vessel, in which it can be cooled either to a temperature of 32° Fahr. by melting snow or ice, or else raised to a higher temperature by the heat of a gas-burner. The temperature was kept constant within 1° Fahr. The gas was passed at a rate of about 1½ cubic feet per hour through: (1) A cylinder filled with clean naphthalene which was at the temperature of the room—viz., not below 62½° Fahr., and not above 64½° Fahr.; (2) a cylinder containing anthracene oil, free from benzol and naphthalene, immersed in the water or ice-bath by which the temperature was regulated; (3) a washing cylinder containing acid; (4) and (5) two washing cylinders containing picric acid solution; (6) an experimental meter.

The results obtained are shown in the annexed table.

Results of Experiments on the Washing of Gas Saturated with Naphthalene at 62½° to 64½° Fahr.

Experiment No. . .	1	2	3	4	5
Temperature of washing oil—degs. Fahr.	32	62·6-64	84-84·7	96·5-97·1	122·4-122·6
Grains of naphthalene retained by 100 cubic feet of gas after oil-washing .	0·524	0·481	1·792	4·37	7·298

The gas was saturated, or nearly saturated, with naphthalene at the temperature of the room by passing it through a tower of naphthalene, as already described. It was then passed through oil maintained at the temperatures stated, and the naphthalene remaining in the gas after this washing with oil was determined by means of picric acid. The fact that the naphthalene retained by the gas was not less when the oil was at the lower temperature of 32° Fahr. than when it was at the temperature of 62·6 to 64° Fahr., must be attributed to the greater fluidity of the warmer oil and the greater surface of the bubbles formed with it in this state. Since gas at a temperature of about 64° Fahr. takes up 7·9 to 8·3 grains of naphthalene per 100 cubic feet, it will be seen from experiment No. 5 that, at a temperature of about 122° Fahr., only quite a small amount of naphthalene is dissolved and retained by the anthracene oil. At this temperature the oil has practically no action, and in such conditions washing with oil would be quite useless. The experiments further show that any temperature above about 64° Fahr. is prejudicial to the removal of naphthalene from the gas. It therefore appears established that thorough cooling of the gas is advantageous for the extraction of naphthalene by washing, as well as for the proper action of the cyanogen and ammonia extraction washers. The cooling of the gas should be effected by direct condensation and a proper order of the condensing and tar-extracting plant, and not by sprinkling the gas with water or liquor, whereby dilution of the liquor results. If this method is followed, the recovery of the ammonia is effected almost wholly in a six-chamber washer-scrubber, which follows the naphthalene washer without the intervention of a secondary condenser. The plant and the method of working are thus much simplified.

At the meeting last night (Monday) of the Graduates' Association of the Institution of Mechanical Engineers a paper entitled "Water Softening and Purification" was read by Mr. R. D. M'Groarty. Mr. William B. Bryan occupied the chair.

MIDLAND JUNIOR GAS ASSOCIATION.

A Meeting of the Association was held on Saturday afternoon, at the City of Birmingham Technical School—Mr. R. J. Rogers, the President, in the chair.

The Question of Evening Meetings.

The President, referring to the fact that the date for the reading of the paper by Mr. E. W. Smith on "High Pressure Gas" had originally been fixed as Friday, the 22nd inst., said that unfortunately the attendance at the last evening meeting was very poor indeed. The Council therefore thought it would be well—seeing that many of the district members had expressed a desire to be present on the occasion—for Mr. Smith's paper to be read on Saturday afternoon, the 23rd inst.

A New Honorary Member.

The Hon. Secretary (Mr. W. J. Pickering) read a letter from Mr. E. W. Smith, in acknowledgment of an intimation that he had been elected an honorary member of the Association. Mr. Smith thanked the Council for the honour they had conferred upon him, and assured them of his full appreciation of it.

The Membership Roll.

The Secretary then read out a list of new members, and announced that these brought the number of ordinary members of the Association up to 198.

Internal Gas-Fitting Work.

Mr. W. L. Westbrook (late of Hereford, and now of London) then read a paper entitled "Notes on Internal Gas-Fitting Work;" and this, together with some points from the long discussion to which it gave rise, will be found on pp. 726-9.

The President, in proposing a hearty vote of thanks to the author, remarked that the paper was a very useful one, and they were greatly indebted to Mr. Westbrook for coming all the way from London to read it.

Mr. F. J. Ward (Knowle) seconded the proposition; and it was carried with acclamation.

Mr. Westbrook, in acknowledgment, remarked that it had given him much pleasure to prepare the paper, as well as to come down and read it.

The Next University Lecture.

The President said that, in view of the coal strike and the consequent disorganization of the railway services, it had been agreed that it would be better for the meeting on Thursday, to hear Professor Burstall's next University Lecture, to be held at 6 o'clock, instead of 7 o'clock, so that members coming into Birmingham from out-districts might have an opportunity of getting back again. This arrangement, of course, was providing that the time was suitable to Professor Burstall.

SOME MODERN PROBLEMS OF ILLUMINATION.

The problems surrounding illumination tend to grow; and every advance made lets light upon new matters that require investigation. This only shows how little we knew, and how superficial was what we did know, of the subject before. The opening remarks of a paper by Mr. T. Thorne Baker, F.C.S., F.R.P.S., read at the Royal Society of Arts last Wednesday, brought this acutely home. As he pointed out, during the past two or three years, quite a large amount of attention has been paid to the subject of illumination, from more or less new points of view which have been suggested by modern conditions of living and working. Formerly it mattered little whether a candle, an oil-lamp, or a Bray's gas-burner was responsible for the lighting of a room, provided only that the illumination were sufficient. Now an illumination is needed which must possess the maximum economy, the maximum of diffusion and distribution, and which must be of a colour required by the dictates of hygiene. The means of testing an illuminant, of modifying its light so as to produce an illumination which is physically nearest to what is ideal from the point of view of hygiene, and so on, are few, and are appreciated by the few only who have made this subject a matter for personal attention. The author's paper points to simple ways and means of producing an illumination as nearly resembling daylight as possible, which can be adopted by illuminating engineers and others with a small amount of expense, and which will yet give results of sufficient accuracy to satisfy modern demands.

While so much attention is being paid to the subject of lighting, from hygienic and similar points of view, Mr. Baker thinks it seems fairly evident that its spectroscopic character should receive due consideration; but up to the present he does not think that the colour of light has been seriously dealt with by more than a few independent workers. Investigations with bacteria inclines him to the belief that the artificial light employed for the habitation of human beings should be that to which they are normally accustomed—viz., daylight; and he thinks that research to determine the most suitable light for the eyes will lead to one result only—the demand for a light that is spectroscopically equivalent to normal daylight.

Except in isolated cases of specialization, the illuminating engineer has not closely associated spectroscopic methods with the practical side of lighting and illuminant testing, though now much valuable work is being done by Dr. Ives and Mr. Luckiesh. Mr. Baker has come across many instances in this country where industrial work has been hampered through the use of artificial light, ideal, perhaps, from the engineer's point of view, but very deficient from the physicist's point of view. One example, of which there must be many hundreds of cases, was that of a factory where the printing of wallpapers was carried on. Considerable difficulty was experienced, especially in winter-time, in the matching and choosing of colours; and it was found that, when the daylight was good enough, the colour matching—of the dyes, &c.—was done by it, whereas in dull weather it was carried out by the light obtained from carbon filament lamps. Considerable discrepancies naturally occurred from this practice; and a special lamp was made, in which he employed metal filament (tungsten) lamps, and a suitable light filter, which gave filtered light spectroscopically equivalent to daylight, so that uniform colour-matching and accurate selection of dyes and pigments were ensured.

As a standard, white cloud-light is best; and therefore attempts are directed to the screening of various forms of illuminants so that artificial illumination physically equivalent to daylight is obtained. The author discussed the analysis of illumination by spectro-photography, and showed two or three different forms of simple spectro-cameras for taking photographs of the spectrum of the light of any illuminant which is focussed on the slit of the instrument. Suppose a series of photographs is taken on a very evenly sensitized panchromatic plate, of No. 1 illuminant (let us say) open arc, with an uncored positive pencil; and then another series of No. 2 illuminant (let us say) carbon filament electric lamp or incandescent gas. On developing the plates under equal conditions, two sets of photographs are obtained of the spectrum of the two illuminants, and, by comparing the most suitably exposed spectra in each, the most obvious differences can be determined with considerable accuracy. By slides, he showed how relatively rich the arc light is in violet and blue, and how relatively rich the incandescent light is in greenish-yellow and red. A green object will look too bluish-green in the first light, and too yellowish-green in the second, speaking comparatively.

If now these spectrum records are divided into equal divisions (each division being a specific region of the visible spectrum) and, with a suitable photometer, the densities of these regions are measured, and plotted against wave-length, two curves are obtained which, when compared, indicate the relative spectroscopic character of the illuminants. The results give no definite measurements of the analysis of the illuminants; but they supply all the indication requisite on which to base experiments for the production of a screening-filter to render the screened illumination No. 2 identical with the illumination No. 1.

The next section of the paper was devoted to the illumination provided by the discharge of high tension currents through vapour or rarefied gases. In the course of this, Mr. Baker stated that helium vapour lamps have quite recently been adopted by the Bureau of Standards at Washington as the standard unit of illumination; and one very important point, he thinks, in favour of this choice is the fact that the luminosity of the tube remains constant over a wide range of current. It is naturally a great advantage to the observer if a 5 per cent. increase in the current supply of the standard lamp causes no variation in its candle power. But the apparent colour of the light renders it extremely suitable for comparative purposes, as it is a more or less "happy medium" of paraffin oil gas, flame gas, incandescent gas, and metal filament lamps. For an unfiltered light, the open electric arc and the acetylene flame [What of high-pressure incandescent gas lighting?] are the nearest approaches to daylight; but, owing to the constancy of the candle-power under varying circumstances of the helium vapour lamp, the latter should prove to be ideal as a standard light source.

There was no need for the semi-apology with which Mr. Baker concluded his lecture. He hoped that those who are actively interested in illuminating engineering would forgive him if he appeared to have trespassed too much on their province on the plea of spectroscopic methods; but modern education is causing many demands to be made with which the illuminating profession were not faced even a year or two back; and, quite apart from the question of the ideal light for hygienic needs, there certainly is room for the introduction of "standard daylight" in the laboratories and testing-rooms of hundreds of industrial factories in this country, and for the greater utility of many of our public museums and galleries.

The discussion on the paper covered numerous points; and it indicated that there are many interested workers in this field. The opinion was expressed by Mr. A. P. Trotter that the time has now come when we ought to be able to produce in artists' studios, picture galleries, and in industries artificial light which shall be equivalent to daylight. He pointed out that Dr. Kenneth Mees [*ante*, p. 217] has produced a filter for metallic filament lamps which is photographically correct. But he only gets about 50 per cent. of his light through the screen; while Mr. Baker estimates that to screen the tungsten filament light to simulate normal daylight he only wastes from 2 to 3 per cent. with his screening filter. But, said Mr. Trotter, we do not want the artificial light photographically correct with normal daylight for colour purposes; we want it visually correct. Attention was called by Mr. Gaster to the very interesting paper read by Mr. Ritchie, before the Illuminating Engineering Society, on the subject of colour discrimination by artificial lights [*ante*, p. 215], and to the differ-

ence between Mr. Baker and Dr. Kenneth Mees as to the light absorption by the filter-screens. Then Dr. Edridge-Green and Mr. Ritchie spoke; the latter also attacking the "miraculously low absorption factor" of Mr. Baker's filter-screen. He mentioned that the author had not given information as to the percentage accuracy, colour by colour, right through the spectrum. He also asked whether the filter has been in existence for a sufficient time to enable Mr. Baker to say anything as to its permanency. Dr. Mees' experiments, he held, have been very thorough; and that we do know that his filter as it is now being made is permanent, which after all is a great thing to be sure of. In his opinion, the efficiency is not of so much moment as compared with the permanency. Mr. Dow and Mr. James Swinburne (who presided) also contributed to the discussion. The latter was curious as to the best colour spectacles for people to wear for protecting their eyes in work upon brilliant lights. In the old days, people used to wear blue glasses; now they were a kind of yellow. To this question Mr. Baker replied that, in experiments with bacteria in his laboratory, green seems to be the colour for every kind of organism found. In vegetable life, it is normal. The conditions, growth and reproduction, of bacteria are normal in the green-yellow part of the spectrum. Primarily, for this reason, he thinks the green rays are the most suitable for human beings as well. Another thing that he has observed is the extraordinary lack of fatigue of people who work under the light of the mercury vapour lamp. With reference to the 3 per cent. loss through the screen, naturally the loss varies enormously with the different illuminants. He confessed he had mentioned the 2 or 3 per cent. loss quite haphazard, having in mind the arc lamp, in which case simply the ultra-violet rays are filtered out. The efficiency would be much less with the metallic filament lamp than with the arc lamp. As to the efficiency of his own filter, he believes he has got hold of one or two dyes that will make the subject much easier than at first sight appears. As to Mr. Trotter's remarks, Mr. Baker thinks the photographic and visual tests should be done together.

DETERMINATION OF NAPHTHALENE IN OIL.

An article by Herr C. von Stilliger, Manager of the Eger Gas-Works, in a recent number of the "Journal für Gasbeleuchtung," describes the method which the author has adopted for the determination of the amount of naphthalene in anthracene oil which has been used for the extraction of naphthalene from gas by washing. The naphthalene extraction plant at the Eger Gas-Works consists of a rotatory washer of a capacity of 350,000 cubic feet per diem. The naphthalene content of the oil is checked by fractional distillation to a temperature of 270° C. before it is returned to the washer.

Difficulties in fractionation arise through the water present in the oil which has been used. In order to overcome these difficulties, the sample of oil from the washer is partially dehydrated by allowing it to stand, and removing the portion of about 150 cc. required for testing by means of a pipette. This portion is then almost completely dehydrated by agitation with granulated calcium chloride. From the dried portion 100 cc. are taken for distillation. The distillation is carried out in a flask, with a short fractionating column, connected to a Liebig condenser about 12 inches long, and having a wide tube which will not readily become blocked by naphthalene. A small flame is used until the temperature of the vapour rises above 100° C., whereupon the flame is increased and the circulation of cold water through the condenser is stopped. When the temperature reaches 200° C., a measuring cylinder is put over the end of the condenser tube to avoid loss by volatilization of fractions between 200° to 270° C. With the precautions indicated, cracking of the fractionating flask, which is of the ordinary circular bulb type and of about 250 cc. capacity, is avoided. A Teclu bunsen burner is used for heating it. Contrary to an experience reported by Herr Hahn, of Kötzschenbroda, that the water rises to the surface of the oil when the temperature is above 50° Fahr., the author has found that the water always settles to the bottom of the oil, and in a separating funnel the heavy oil strata are always above the water.

Natural Gas in Austria.

An article by Herr Johann Frank, in a recent number of the "Journal für Gasbeleuchtung," gives an account of natural gas which is obtainable from borings over a wide area in the neighbourhood of Wels in Upper Austria, and suggests uses to which it might be put. An analysis of the gas obtained from one boring shows it to have the following percentage composition: Methane, 96·3; carbonic acid, 0·6; carbonic oxide, 0·7; oxygen, 0·6; hydrogen, 0·8; nitrogen, 1. This analysis indicates that the gas closely resembles the natural gas of Pittsburg and neighbourhood. It has a specific gravity of ·5667, or somewhat higher than that of coal gas. It is estimated that a boring to a depth of 1150 feet would be necessary to obtain a regular supply for industrial purposes, and that the cost of the boring and of a gasholder would be about £375 to £585. Hitherto only shallower and insufficiently wide borings have been made. The article suggests that there is an ample underground store of gas, at a lower pressure than at Pittsburg, and proposals are made for its employment for a number of industrial purposes and for filling airships.

NOTES ON INTERNAL GAS-FITTING WORK.

By W. L. Westbrook, of London.

[A Paper read before the Midland Junior Gas Association, March 9.]

All up-to-date men in the gas industry to-day recognize the importance to the undertakings with which they are connected of an adequate and well-trained staff of fitters.

The Fitting Staff.

Increased Qualifications Necessary.—The duties and qualifications of the gas-fitter of twenty years ago and to-day are so altered that they might belong to two separate trades; for, with the advance of high-pressure and the continued progress in heating and lighting appliances, the demands made upon the technical knowledge and skill of the fitting staff must continue to increase in proportion.

Importance of Selecting and Training the Future Fitter.—This means that men with brains and training are required; and as the fitter of a few years hence is being trained to-day, it is for those responsible to see that they are training the best material possible for the continued advance and prosperity of the industry. It is recognized as "good business" to get the best; but the owners of the best brains will nearly always seek to employ them in the industries and professions that offer the best prospects in return.

Gas Suppliers v. Traders' Fitting Methods.—Are the gas-fitters and gas-fitting of to-day up to date? Probably most of the men employed by gas departments and gas companies are. But what of the great number of men employed by private firms, builders, plumbers, and ironmongers? And how does the work done by the latter affect the suppliers of gas?

Carcassing.—Take the important work of carcassing in new buildings. Does the builder's fitter put in pipes adequate for the requirements of a gas consumer in the year 1912, with a view to supplying gas fires, cooker, and boiler in addition to lights? Or does he put in pipes that would have answered the requirements of twenty years ago, because his "boss" wants the cheapest job and does not care how much or how little gas the pipes carry so long as he obtains his rent regularly? Would it not pay gas companies and gas departments to get hold of this carcassing work, and lay on adequate pipes, leave points for lights in good positions, and points for gas fires, cookers, boilers, &c., on a separate heating supply system of pipes—each floor being supplied direct from common main rising pipes? The work could be done quicker, neater, and better during the building of the house than to have to cut through walls, woodwork, &c., and make good after the house is completed. A better-arranged installation would be the result, and fewer complaints of bad supply and leakage would arise than at present, when, after the builder's man has gone, the gas company send and add 60 feet of piping and a cooker, and three months later add a further 40 feet of piping and a couple of gas-fires (if the consumer does not cancel the order because he objects to having the carpet up or the floor boards cut about), and so on.

Proportioning of Pipes.

Possible Extensions.—In arranging for a job of any description, the fitter should always bear in mind possible extensions, and lay pipes of sufficient size to provide for any additional lights or appliances that, according to the nature of the premises, might be required in addition to the immediate work in hand. Here, again, the case for the company doing the carcassing work comes in; for it would not be fair to a tenant to charge for large size piping for a job if his requirements did not warrant it.

Necessity of Uniform Pressure.—Another point in the proportioning of pipes that deserves more attention than it generally receives is the necessity of uniform pressure if the best results are to be obtained with adjustable inverted burners. Take, for instance, an installation of ten 3-light inverted lamps (consumption, say, 12 cubic feet per hour per lamp); the question arises as to what size pipe to run. It is not now a matter of what size pipe will supply the lamps, but rather what size the pipe should be to supply them without loss of pressure; for, if you lay a ¾-inch pipe and lose (say) 1-inch pressure with the ten lamps on, and set your adjusters to suit, then, if only two or three lamps are required you get these lamps working at a pressure 1-inch greater than they were adjusted for, and consequently an unsatisfactory result.

Uniformity of Method Needed.—In piping houses, much trouble would often be saved if there were more uniformity of method. For instance, most makers fit pendants with ⅜-inch iron cup and ball joints, yet one finds sometimes ½-inch, ⅝-inch, and ¼-inch iron drop-pipes put in to receive them. The same remark applies to points left to receive brackets. Tees and plugs at the bottom of vertical pipes should be the recognized practice, and connectors at the tees to enable branch supplies to be disconnected from the main supply pipes.

The Puncturing of Covered Compo. Pipes.—Where compo. pipes are laid under the plaster to supply brackets on chimney breasts, there would be less fear of getting nails through if the pipes were run down in the recess angle of the breast on either side, instead of the usual branch pipe across the front of the breast, which frequently gets nailed through in the fixing of overmantels, picture rails, &c.

Choice of Type of Burner.

Inverted v. Vertical.—One finds the lighting of many rooms to-day spoilt by inverted brackets and burners being fixed on points the height of which was arranged to suit the vertical type, or, worse still, inverted burners fitted to upright brackets. Of course, the inverted burner is fashionable; but it is far better to advise the consumer to use the vertical type in preference to the inverted at 5 feet from the floor. Personally, I consider the "C" burner for rooms lighted by brackets from side walls gives a better lighting effect than the inverted, besides which it has several other advantages over the newer type.

Consumers' Need for Advice in Arranging.—Careful consideration as to the type, lighting power, and position of the burners and fittings should always be given if the best results are to be obtained; and the consumer who has a visit from an experienced inspector, tells him his requirements, and acts on his advice, invariably obtains a more satisfactory job than the individual who calls at the show-room, selects any fittings, burners, or gas-fires, &c., that take his fancy, and has them fixed up to suit his own ideas.

Selection and Fitting of Gas-Fires.

Heating Capacity.—The fitting of gas-fires is a most important item in the duties of the fitting staff. Care should be taken that the fire selected is capable of comfortably warming the room in which it is to be fixed in the coldest weather; the cubic area of the room, number of exterior walls, window space, and aspect being noted.

Constructional Points.—The fire should have a good bold canopy, a flue of adequate area, no flue passages in the fire itself, and no pockets or joints in the flue chamber. A removable burner, with right and left hand connections, fitted with simple, but efficient, gas and air adjusters, and the fuel well fitting in relation to the flame and the brick, and not easily shaken out of position. A duplex burner and tap is an advantage with large-sized fires.

Fit and Appearance.—Then the shape and appearance of the fire should harmonize with the grate to which it is fitted; and it should be the aim of the fitter to fix the fire in such a manner as to make it appear part and parcel of the existing grate. This could more often be done effectively if makers would extend the outer casing of fires beyond the back casting, so that, in the case of the bars of existing grates being fixed, the gas-fires could still be fitted right back to the grate behind.

Precautions in Fixing.—All flue-pipes should be secured to the nozzle of fires with bolts and nuts, or screws, and the fires themselves firmly stayed or clipped-back to the grate behind. This should be neatly done and, as far as possible, hidden. "Wedging-up" of fires and "wedging-on" flue-pipes is bad practice. The author has found many fires with wedges displaced by servants in cleaning, and with the flue-pipes detached altogether. Many nozzles of fires are tapered so that the flue-pipe only fits tightly at the extreme end. Here, again, the makers might assist by making the nozzles of even size, and drilling and tapping them to receive a securing screw on the flue, and arranging a wider and firmer base, which might be slightly higher in front, as some gas-fires have a distinct tendency to topple forward unless clipped-back.

Fire-Tap and Connections.—All fires should be connected with copper or brass tube connections, with floor tap firmly screwed to the floor, or union tap fitted under the floor, with key and plate and union by the fire for ease in disconnecting.

Nature of Chimney Flue.—Perhaps the most vital point to be considered is the nature of the chimney to which the gas-fire flue is to be connected. The chimney should always be examined before commencing operations, swept if necessary, the draught tested, and inquiry made if trouble has been experienced during the use of coal-fires, as often a gas-fire is ordered because the coal-fire smoked so badly. In the case of a chimney with sluggish draught or occasional "back-blow," the backing of the grate with sheet iron, and the fitting of a flue-pipe and cone, will usually overcome the trouble.

Down-Draught.—The chimney with a constant and bad down-draught is a very different problem; and the attempts to cure this trouble are more often than not unsuccessful, as one hears of different firms having tried various makes of chimney pots and cowls without success.

Suggested Remedies.—The simple devices described by Mr. E. W. Browning, in his paper before the London and Southern District Junior Gas Association [see "Journal" for Jan. 31, 1911] are all well worth trying when such conditions are met with.

Cooker and Boiler Flue-Pipes.—In connecting flue-pipes from cookers or boilers a T-piece and funnel hood respectively should always be fitted to the nozzles, and, where possible, the flue carried into a chimney which has a steady draught, as this tends to increase the safety and efficiency of both cooker and boiler.

Internal Leakage.

Leakage on Internal Pipes and Fittings.—With regard to leakage on internal pipes and fittings, those who have had experience in testing installations will perhaps agree when I say that, apart from quite new work, it is the exception rather than the rule to be able to get a satisfactory test at 8 inches of pressure with a portable dry pressure-gauge.

Installations will not Stand Test.—When I say a satisfactory test, I mean that, given good workmanship and good material, the gauge should remain stationary at 8 inches or 10 inches water-gauge. That an ordinary installation will not stand this test is rather discreditable to the gas industry. Why this leakage? What are the causes and remedies for the trouble?

Some Causes of Leakage.—(1) The gas-fitter must not take all the blame. Yet while we have many good men who are doing first-class work, it is also a fact that men who are not fitters at all are screwing-up fittings and laying pipes in such a manner as to be positively dangerous to life and property. Again, there are really good workmen unable to do good work owing to not being provided with proper material by employers, and having to "make do" with material of inferior quality. (2) The quality of fittings is also a vital one, as regards pendants and brackets and various brass and iron fittings, unions, &c. There is a tendency to-day to sacrifice efficiency to cheapness. No doubt competition is chiefly responsible for this. But will it pay to allow it? Referring to the testing of installations again, after leakages in pipes have been located and repaired, if a sound test is required, swivels, taps, and cup-and-ball joints have to be dealt with on every fitting in the house; and yet the wearing parts of many of the fittings sold to-day will not hold gas-tight as many months as the old ones have years. What will be the result of taking down fittings that have served a consumer well for perhaps a dozen years and putting up some that will be condemned in a quarter of the time? Again, take some of the cheaper grade cookers to-day, and after a year or so ordinary wear, test them at 8 inches water-pressure. Plugs of taps are loose, and pass gas round the plugs and through the taps, and ill-fitting screws and washers are discovered.

The above defects are responsible for some of the small leakages that are always annoying to the consumer. The larger and the more dangerous leakages are caused chiefly by compo. piping being attacked by rats and mice, or getting nailed through or cut where improperly hooked up, by corrosion of iron piping or negligent screwing-up of joints, and also by corrosion of the cases of dry meters.

Remedies.—So much for the causes of leakage. Now for the remedies. (1) With regard to the out-of-work painter or "handy" man who puts up a fitting here and there and makes a "sound" joint with plenty of white lead or putty. In view of the serious aspect of the question, it should be made illegal to employ a man to do gas-fitting work who does not hold a certificate of efficiency. (2) With regard to the pipes and fittings, all gas suppliers should insist on pendants, brackets, and small fittings being substantially made to stand a specified pressure. All houses should be carcassed throughout in iron during building; provision being made for cooker and fire supplies, and the pipes so fitted as to allow of access at any future time. If the work cannot be undertaken free of cost, it should be done at cost price or less; and, finally, it should be done under efficient supervision and subjected to a thorough test. Further, suppliers of gas should undertake to test consumers' fittings and repair escapes at low cost. This overhaul should be of the most thorough description, and subject to the pressure-gauge test; in troublesome cases, ether being used under pressure to assist in locating defects.

In certifying an installation as sound by the pressure-gauge test, the fitter or inspector should always assure himself that the gauge is sensitive to loss by releasing a little pressure at a tap. Then carefully watch the gauge; and if there is not a perceptible movement, the work can be passed. Should there, however, be the slightest movement, it is most important to bear in mind "that the rate of drop of the gauge is in direct proportion to the cubic capacity of the pipes and meter under test." Thus, in two installations—one of ¼ cubic foot and the other of 1 cubic foot capacity—with exactly the same rate of drop on the gauge, the leakage would be four times as much on the larger system, or, in other words, the larger system with four times the amount of leakage would only show the same rate of drop by the pressure-gauge.

The Meter Index Test.—Finally, may I say that the old method of testing an installation by the index of a meter is most unreliable, if not a source of danger. When a fitter applies the index test, does he first satisfy himself that the meter does actually register at all? Or, further, that it will register with only one light on or record bye-pass consumption? If he does not do all the above, his test is useless; if not any, it is dangerous.

Dry Meters.—Dry meters should be regularly brought in (say, every five years), and tested and painted.

Meters.

Fixing.—A few remarks on dry meters in conclusion. With regard to fixing, a substantial and neat wooden shelf should be used, and the meter placed at least 2 inches from the walls.

Arrangement of Pipes.—The inlet and outlet connections should be of fairly stout lead; and in connecting up to compo. pipes, the end of the outlet pipe remote from union should be bent round and fitted to the wall with a brass nosepiece and cap. From this pipe all branches should be taken—all neatly hooked-back to the wall and arranged in order, not, as is too often seen, like the branches of a tree, spreading in all directions. If convenient, the lowest branch nearest the drip should be a cooker supply. This acts as a "tell tale" should water collect in the drip, and gives notice before the lighting supply is interfered with.

Liability to Pass Unregistered Gas.—Always after fixing or inspection of a meter it should be the duty of the fitter to see that the meter is registering by the one-light test. If this were conscientiously carried out, a good deal of unaccounted-for gas would be transferred to the credit of undertakings. The same remark applies to the periodical testing of meters.

In conclusion, may I say that I believe there is in the gas in-

dustry to-day, both locally and generally, a fuller appreciation of the mutual interests of employers and employees and more *esprit de corps* than in any other?

Discussion.

The PRESIDENT (Mr. R. J. Rogers, of Birmingham) pointed out that the paper covered a wide range of subjects, and should lead to a good discussion.

Mr. W. LYCETT (Birmingham), referring to the remarks on the importance of training the future fitter, said he thought that, in addition to the daily work when going about with his mate, there was nothing better for the future fitter than to attend the classes that were now organized and carried on by most of the larger gas undertakings. In this way he would get all the information that he would require when he became a fitter. Where they failed, he thought, was in not being able to get hold of the outside fitters' boys. Every inducement should be held out to them to join the classes. He found that usually the age at which the youths began to take a great interest in their work was from 19 to 21. They were very keen then; and he had heard them say they would like to continue the classes, which they generally left when they were 21. As to the loss of 10-10ths pressure on an installation of ten three-light inverted lamps, with a ¾-inch pipe, and all the lamps on, this seemed to him tremendous. Then he did not quite agree about the superiority of "C" burners over inverted ones for side brackets. They could, if it was, as stated, 5 feet from the floor, raise the height of the light by having ascending brackets; and it was certainly better to have inverted burners near the fire, to read by, than the vertical pattern. He was in agreement with what was said as to fittings supplied nowadays. It was to be feared that, to a great extent, efficiency was being sacrificed to cheapness. It was possible to find older fittings that had been in use a number of years, and were still in good order; while more modern ones, which had been in use only a few months, might be found with the taps already loosened.

Mr. B. J. BELL (Birmingham) said the author asked whether it would not pay gas companies and gas departments to get hold of the carcassing work. Personally, he (the speaker) did not think the suppliers of gas should find it necessary to cut out the ordinary private traders in any such way. It would be far better if those who were established primarily to supply gas were to help as much as possible those who got their living from actual gas-fitting work. There had been a good deal said from time to time on this point; and one of the electrical journals had argued that the contractors for electric fittings were more pushing than the gas-fitters in private trade. Now, he thought they could get at the whole seat of the difficulty in this way: The majority of the electrical contractors were highly qualified engineers, who had had a training and then started in trade; whereas a large number of the smaller gas-fitters had had no such training, and consequently, from ignorance, did very poor work. The authority who were supplying the gas should get hold of these fitters and help them as much as possible. The gas suppliers might, if necessary, provide supervision, and see that the work was carried out properly; but they should not enter into competition with the fitters by doing fitting work at less than cost price. They must admit that the private gas-fitters controlled to a large extent the ordinary trade; and if they got these fitters against them in any shape or form, those who supplied gas, and were dependent on the profits secured from their commodity, would eventually lose customers through the adverse criticism of the men who did gas-fitting work. The author maintained that it would not be fair to a tenant to charge for large sized piping for a job if his requirements did not warrant it. If a man bought a thing, he expected to pay for it according to its value; and he thought that, in the same way, the general public ought to pay for work that was done for them. As to pressures, it was absolutely necessary that uniformity should be the rule; and it was to be anticipated that in the future this point would require a great deal more attention than had been paid to it in the past. Again, the type of gas-burner that was chosen by a consumer was often one that was sold for a very small sum; and the cheaper he could get it, the better pleased he was. The thing to do was to get at the people who supplied these burners—that was to say, the people who sold these cheap burners should be educated so that they would not recommend them. There was no doubt that at present inverted burners were fashionable, and so they were selected on every possible occasion, irrespective of the position in which they were going to be placed. More attention ought to be paid to the lighting of the larger buildings. It was not uncommon to go into a church or public hall where it was almost impossible to see the preacher or the speaker on the platform owing to the dazzling effect of lights placed in a wrong position. This was a point on which information was most valuable. Of course, very often there was little choice left to a consumer, owing to the pipes being laid in unsatisfactory positions, with consequent disastrous results. No doubt, every possible inducement should be held out to people to use gas-fires, for in the near future the increase in consumption would depend upon the number of these appliances that were fixed. Gas undertakings must do everything they could to increase the popularity of these fires. Whether they could do much in the way of arranging to have the necessary pipes fixed at the time of building a house, he was not sure. He had had experience in another part of the country where builders were approached to do this work, and had refused to. It added to their outlay; and consequently they would not do it when building houses.

Mr. A. HANCOX (Great Malvern), alluding to the author's remarks on "C" and inverted burners, said he thought Mr. Westbrook must have had in mind large rooms, and not cottages, where a consumer could only afford to have one light in a room. He (the speaker) found an inverted burner was much better than one of the ordinary upright burners for (say) reading when sitting by the fire in the evening.

Mr. F. W. DEANE (Wednesbury) said he would like to add a few words about the importance of continuation classes. The gas industry had certainly not yet reached its highest standard. There were always new gas appliances coming out, which young gas-fitters in out-of-the-way places were not likely to see or hear of, unless they went to larger centres where such things could be brought to their notice and they could be properly educated up to the standard required by all progressive gas undertakings. As to the boys belonging to outside fitters, it would be a very good thing if they could be brought into touch with these classes. They knew that, in regard to plumbing work, their own Corporation insisted that the men should be authorized before doing work; and there was no reason why a gas-fitter should not be put under the same conditions. He might obtain a certificate of proficiency. As to the installation of pipes, he was not sure that architects took this matter into consideration as fully as they might do. Probably a great many of them desired to put in electricity, instead of gas. Gas suppliers should bring the question before architects, so that pipes of an inadequate size should not be put into buildings. Compo. pipes in houses were a difficulty nearly all of them had to contend with. There would be overmantels fixed, and nails inevitably found the right place for an escape; but fortunately compo. pipes were becoming obsolete, and iron pipes were now being laid instead. A point in connection with the use of inverted burners was economy. Consumers found that with them they obtained a good light—probably 60-candle power—for 3 cubic feet of gas per hour, in place of 5 cubic feet with "C" upright burners. At any rate, this was the inducement held out by makers of inverted burners for their sale. The hint that dry meters should be placed some distance from the wet wall of a cellar, was a very useful one.

Mr. W. E. CADWALLADER (Birmingham), referring to the training of future gas-fitters, said he thought most of the leading undertakings were now doing this; having special classes for training youths. Personally, he was of opinion that it would be better if, for the first year or two—perhaps until a boy was 16 or 17—he was obliged to attend the council continuation schools which were held in every centre, in order to improve his general education. Usually speaking, he thought gas-fitters were quite as well, if not better, educated than the majority of workmen in a similar position; but it would be well if gas undertakings insisted upon them attending continuation classes to improve their general education, and then for the last three or four years of their apprenticeship they should go in for the more technical classes that the gas undertakings held. This would operate towards overcoming the tendency to "staleness" that seemed to always occur when a youth had to attend a class for (say) six years. That was to say, it would be preferable to grade the classes, so as to give a better education in the first two or three years, and then for the next three or four years make arrangements so that the youth would be gradually progressing, until, when he was out of his time, he would have had a thorough theoretical training, as well as a practical training in carrying out his daily duties. No doubt it would be very easy for gas suppliers to take on carcassing; but it seemed to him if gas departments connected with municipal or district councils were to go in for this sort of thing at cost price, they would soon get some of the ratepayers on their track. They would certainly have the master gas-fitters making a great outcry. It would probably be better to spend a little money on providing suitable inspectors to visit architects and builders in the district, and try to educate them up to the necessities of modern gas-fitting. Among the many things that an architect had to learn in order to become efficient, gas-fitting took quite a secondary place; and if gas undertakings approached these gentlemen, and builders, in a reasonable manner, and pointed out all the advantages of a proper gas supply, it would be to the benefit of the industry. If a man was spending £1000 on a house, he would far rather pay an extra pound or two to have the gas put in satisfactorily, than have the carpets and floors up again after the house had become tenanted. He had spoken to several builders on the subject of leaving tees for gas-fires. They generally objected to run pipes all the way, but seemed quite reasonable in regard to leaving a tee in a suitable position in rooms where gas-fires were most likely to be wanted. There was a reference in the paper to the height of brackets from the floor. He was speaking to a gas-fitter recently, and trying to get him to fix the brackets in some bedrooms somewhat higher than 5 feet. The reply, however, was: "I have got twenty-four houses in all to fit up. There are three bedrooms in each; and if I put the brackets 6 feet from the ground, it would mean 72 feet more pipe, for which I should get nothing extra." It was difficult to convince a man like this. The author's first note on the selection and fitting of gas-fires—namely, with regard to heating capacity—was very important. He had often come across cases where the fires were of quite inadequate size. A point to be remembered was that gas-fitters should not only have good materials, but also up-to-date tools to work with. The tools should be kept in as high a state of efficiency as possible.

Mr. F. SHEWRING (Droitwich) remarked that his experience

with regard to the piping of houses was that he had had little trouble in inducing architects to put in any size of pipes necessary for a particular house. There was more trouble when they had to contend with speculative builders or people who had undertaken to put up a house for a fixed sum, because economy with them was the point most considered. The quality of fittings was most important. They must remember that one fitting in the olden times would probably weigh as much as all the modern fittings found in a house now. One thing he would like to draw attention to was the casing of exterior pipes. He had an instance in mind in which he had extended the gas supply into about 25 or 30 bedrooms in a house; and he knew very well that, if he had not been able to assure the consumer that there would be no disfigurement, but that the encased pipes would make a very neat job, the order would have been held over until such time as the rooms required re-papering. As to leakage on internal pipes and fittings, he agreed that there were very few cases in which one got a really sound and satisfactory test. He found there were frequently some minor leakages, quite small in themselves, but sufficient to mar the test. He had tested an installation where the best material and workmanship had been used; and the result revealed a slight split socket. The importance of testing was therefore obvious, even if they had the best workmanship. In encasing the pipes, he had simply adopted the method of their electrical friends; and the cost price was only about 1d. per foot.

The PRESIDENT remarked that a good deal had been said as to the value of the classes to the gas-fitting trade—both to the men employed by gas suppliers and those in private work. In Birmingham, they were starting to give lectures to the senior members of the gas-fitting trade, so that they could obtain exactly the same benefit in the matter of technical education as the Corporation fitter did himself; and during the past session inducements had been held out to the youths in the employ of the outside gas-fitters. The fees were paid by the Corporation Gas Committee, to enable the youths to go to the technical school and obtain exactly the same benefit as those employed by the Corporation. In this direction, therefore, they were securing unity; and he felt sure the outside trade would appreciate it. As a teacher of these youths, he quite understood the necessity of continuing the classes after they had attained the age of 21 years. In many towns, he believed, there were now divisions into junior and senior classes; while in some cases only junior classes were held. There was no doubt that the time when a young man could obtain the greatest benefit from technical instruction was when he was (say) 21 or 22 years old. He had been able to grasp the elementary principles of many of the sciences he should know a little about; and this was the time when gas undertakings should endeavour to keep him "within the fold." So they wanted really permanent classes; and it was to be hoped that, with the certification of gas-fitters—which he trusted would go through the Senior Association—such classes would be held throughout the country. They wanted men to be certificated, so that everyone who did gas-fitting work would be a man who had had proper instruction in his trade before being allowed to do it. In the matter of carcassing work being done when a house was built, he thought a thing that went greatly against a builder putting in pipes now was the fact that many undertakings ran the pipes free for consumers; and unless they were prepared to offer some inducement to the builder to put them in whenever erecting a house, it was to be feared that he would not do so. With regard to uniformity of method, this was a matter which really should be taken in hand. There was no reason at all why with (say) a three-light pendant the proper size should not be arranged as between the suppliers of gas and the makers of the fittings. The gas a three-light fitting would consume was known beforehand; and uniformity of size would save a lot of unnecessary nipples, &c., that were apt to lead to leakage. There were many positions where the "C" burner would be the better form to use; but it was fashionable to have the inverted burner, and due consideration was not always given to the kind of illumination required—whether or not the rays should be downwards. There was, no doubt, still room for improvement in gas-fires, though they had already reached a high state of perfection. The gas and air adjustments, and also the methods of removing the products of combustion, were not in every case altogether satisfactory. The question of standardizing fuel was also worthy of consideration by the makers. He had found sometimes that gas-fitters did not leave gas-fires so firmly fixed as they might; and in this direction, again, it might be of advantage—especially with fires that were liable to topple forward—if the makers would leave a clip arrangement or a hole which a pin with a nut could be put through—preferably out of sight, but where it would be useful in securing the fire firmly to the grate. Down-draught and sluggish chimneys should receive more careful attention on the part of those who went to inspect fires. A great deal of prejudice in years past had been caused by insufficient precautions being taken in this direction. One bad gas-fire would perhaps lose them ten other possible customers. The cheap fittings being sold would make the question of maintenance a very serious one in a few years' time; and even now, in many cases where cheap fittings had been installed, the matter was being felt. It seemed to him that the meter-index test and the pressure-gauge test should always be combined; for he had known accidents to arise from the fitter using only the latter test. The pressure-gauge did not tell him how much leakage there was. So if the gauge did drop down, it should be one of the golden rules for the fitter to keep in mind that he should look at the index of the meter, in order to get some idea of the extent of the leakage, so as to guide him in his subsequent operations.

Mr. WESTBROOK, in reply, said that, with regard to the question of technical education they were very well off in Birmingham, where there was the advantage of a large community, and an Association such as theirs where young men could meet and discuss things. The majority of places were not so well favoured; and it was with respect to them particularly that something should be done to give the lads a chance to turn out first-class men, not only in the matter of skill with tools, but having a good knowledge of the principles of the apparatus they had to fix, and a thoroughly sound education generally. He could not tell exactly what length of ¾-inch pipe with the consumption named would give a drop of 10-10ths pressure under the circumstances stated in the paper; but in any case the principle remained the same. Several speakers had referred to his preference for "C" burners for side-brackets. When it was a question of sitting round the fire, he agreed with what these gentlemen had said; but in his paper he was alluding more to the general illumination of the room, which he considered was better with the upright burner than with the inverted. He had in mind, also, the unsightly adaptors which one often saw on gas-brackets. Reference had been made to cutting out the private trader, and the opinion had been expressed that he could do the work equally as well as the gas undertaking, if the latter had inspectors to see that it was done. In his experience, a great factor was the question of cutting prices. In the case of two or three outside fitters competing for a job, they would cut everything down to secure the order; and when they had it they would bend pipes in all directions to save using bends and tees. The result was unsatisfactory. Mr. Bell said the private gas-fitters did most of the trade. Here, again, local conditions came in. It might perhaps be so in Birmingham, and not the case in other places. He knew a town where the trade they did was practically *nil*. As to what he had said about the unfairness of charging a tenant for a larger pipe than was immediately wanted, in considering this matter they must put themselves in the position of the tenant. If he (the speaker) went to fix up a bracket or two, and saw a chance of getting two fires in later, he would put in a large enough pipe for this; but the consumer would, under the circumstances, probably object to pay for it. His experience was that architects forgot all about gas unless they were looked up. As a matter of fact, gas people had to see after their own business, or else lose it. It had been urged that there would be an outcry among the ratepayers if municipal undertakings took up carcassing; but, after all said and done, in most towns the proportion of men who were getting their living out of gas was not very great. Of course, the master fitters employed men. But the same amount of work had to be done in any case; so that whether they were engaged by private traders or by the gas suppliers did not make any difference. Probably the man would not be worse off if he were employed by the gas undertaking. His own experience had not been that a person spending money on a house would rather pay an extra pound or two on gas-fitting to have the job done properly. It was, of course, possible to have fittings light, and still well-made. It was more particularly to the workmanship in the cup-and-ball joint, and in the fitting of the tap, that he alluded in his paper. There were thousands of stiff brackets being turned out at 6d. each; and after being in operation a short time, the plugs of the taps of such fittings were liable to leak. If a gas-pipe was well put in, he could not see that it was much more unsightly than electrical casing. The electricity people, he believed, were now putting their wires in tubes like gas-pipes. In some parts of the country, he thought it was the practice to allow a builder so much for every gas-point he put in a house—provided he left electric wiring out. This was worth considering; and it seemed no more than fair. The gas suppliers were going to get the benefit from the gas-fire. If the meter-index test was used with the pressure-gauge, this, of course, would be of assistance in giving an idea of the amount of leakage; but the gauge itself, with experience, would tell them whether the leak was serious.

Glover-West Vertical Retorts for Southport.—The Gas Committee of the Southport Corporation had under consideration, at last Tuesday's meeting, the report of Mr. J. Bond, the Gas Engineer, as to a proposed reconstruction of the carbonizing plant and the introduction of vertical retorts. The Committee resolved to recommend the Town Council to accept the tender of West's Gas Improvement Company, Limited, of Manchester, for an installation of vertical retorts on the Glover-West system of continuous carbonization.

St. Petersburg New Water-Works Contract.—It has already been mentioned (*ante*, p. 567) that Sir William Lindley, of Frankfort-on-the-Main, has obtained the contract for designing and superintending the carrying out of the new water-works and drainage scheme for St. Petersburg. According to a telegram received through Reuter's Agency by the "Financial News," the amounts in the contract signed by Sir William and the Committee of the Municipal Council having charge of the matter are £15,000 and £60,000 respectively; and the contract has to come before the Council. There were, it appears, three tenderers; and one of the unsuccessful ones has protested against the way in which he has been treated by the Committee. Some stormy sittings of the Council are anticipated.

SCOTTISH JUNIOR GAS ASSOCIATION.

EASTERN DISTRICT.

First Quarterly Meeting.

The First Quarterly Meeting for the present session of the Eastern District Section of the above-named Association was held last Saturday, in the Masonic Hall, New Row, Dunfermline. On account of the greatly curtailed train service by reason of the coal miners' strike, there was a somewhat sparse attendance; the difficulty being that while many of the members could come to Dunfermline, there were no convenient means to get back.

THE LATE MR. JOHN PIRIE.

The PRESIDENT (Mr. J. R. Moyes) occupied the chair; and at the outset of the proceedings referred to the death of Mr. Pirie, late Scottish Correspondent of the "JOURNAL." He said that the members had lost a friend, as Mr. Pirie had, from its inception, always taken a great interest in the affairs of the Junior Association; and he was always willing to do everything to advance its interests. They would miss him very much. He moved, and it was agreed, to record the sense of the loss the Association had sustained by the death of Mr. Pirie, and to send to Mrs. Pirie and the members of the family an excerpt from the minutes.

Mr. R. B. CHALMERS (Alva) then gave a conversational account, with blackboard illustrations, relating to

FACTS AND FANCIES IN SMALL WORKS.

Mr. Chalmers is well known for his handiness in utilizing matters which otherwise would be regarded as "odds and ends" in the furtherance of his plans, and some of the results he recounted were as interesting as they were instructive. He first of all dealt with the introduction of the sulphate of ammonia plant at Alva in 1908, and how he produced means whereby the "burning of the lead" was accomplished by himself and his workmen, without recourse to contractors, or, so far as mechanical means were concerned, practically to anything outside the works. The hydrogen and air pressure were satisfactorily obtained; and the results were very good. How a small installation of high-pressure gas was obtained was next explained, and the apparatus described. Steam at 40 lbs. pressure was used. The gas can now be utilized for lighting the workshops. The way in which difficulties in the matter of a water supply were overcome was also recounted. This was done by utilizing an old well, 60 feet deep by the side of the gas-tank. A "Pulsometer" pump was installed, and storage of water was obtained by placing a tank on the top of the condensers. Mr. Chalmers next described how he put small plant for petrol-air gas into a local workshop. They had a pressure of water of 20 lbs.; and the petrol tank was of one gallon capacity. The carburettor was of tin, 8 inches long and 3 inches diameter, and was kept at constant level. Ordinary inverted gas-burners were used; and the installation had been a great success. From Mr. Chalmers' observations, it was apparent he simply utilized the material at his hand, and thought scientifically.

The general opinion of his audience was shown by Mr. WADDELL, who remarked that Mr. Chalmers was to be congratulated on the ready manner in which he improvised what he required. He (Mr. Waddell) thought some of the ideas might be made of commercial use; in any case some of the hints were useful.

Mr. H. RULE (Kelty) spoke of the water supply difficulty at gas-works, and remarked upon the need there is for getting a cheap supply. He said that a visit to Mr. Chalmers' works at Alva would repay members for their trouble, as a large number of "wrinkles" were to be got.

The PRESIDENT also referred to the water supply and suggested, instead of the present system, an overflow to the well. He said Mr. Chalmers seemed to be a very ingenious man; and some of his ideas might be of value to himself.

AN EXPERIENCE WITH A GASHOLDER.

Mr. HENRY RULE, of Kelty, read a paper bearing the above title; and a series of blackboard illustrations were given. The author said: Since the disaster to the Ilkeston gasholder, there has been much discussion in the technical journals as to the stability of spiral holders and steel tanks; so that I thought I might give you a short account of an experience which befel me last winter. On Sunday morning of Nov. 5 last, about 7.30, I was awakened by someone knocking at my door in no uncertain manner. I went out, and was informed by the stoker that there was something wrong with the holder, which is the only one we have. It was blowing a tremendous gale. I went round the holder, and found that the top carriages of the inner lift—it was working on the inner lift only, and rising at the time—were clear of the guides altogether. The wind had apparently shaken the holder until the guide-pulleys (one or two of which had a good bit of play before, owing to the ground sinking) were clear of the guides altogether. It was then only a matter of time until the whole holder was clear and blown round about 1 ft. 6 in. It was leaning over; and on the lee side, the edge of the holder was caught under the first row of lattice girders. I hastily made up my mind that I could pinch it clear; so taking a short piece of ¾-inch tube lying at hand, I climbed the ladder and crossed the top of the holder with some little difficulty. After manœuvring, I just managed to release the holder; and with a lurch it righted, and immediately engaged itself with the outer lift. I could have relieved it by blowing gas off at the purifiers; but I should have been compelled to stand on the top of the holder until it cupped again, and endeavour to keep it clear of the girders. As the wind was blowing at the rate of at least 60 miles an hour, and it was with the greatest difficulty that I could keep my feet, I think you will agree with me that I took the best, and possibly the safest, course.

My troubles were over for a few hours; and I had time to consider what was to be my next move. I tried to get as much gas made to keep the holder as long as possible on the two lifts; but when you consider that the output for the twenty-four hours ending 6 a.m. on Sunday was 95,000 cubic feet, and that the capacity of the outer lift is only 32,000 cubic feet, you will realize that it was hardly possible to do so during the whole of the evening. I therefore immediately put a fire in another bed of retorts.

At this stage, I might give a few particulars of the holder. The tank is of cast iron, 51 feet in diameter by 18 feet deep, 10 feet of which is above the ground level. The outer lift is 49 ft. 6 in. diameter by 16 ft. 6 in. deep; the inner lift, 48 ft. diameter by 16 ft. 6 in. deep. The total capacity of the holder is 62,000 cubic feet. There are eight cast-iron columns; and the guides attached to these are T bars 3 in. by 3 in. There are two rows of lattice girders between the columns and diagonal ties, of 1¼-inch iron. The top carriages are of cast-iron, fixed with a bolt to a cast-iron sole plate. The pulley wheels are 12 inches in diameter, with a 2-inch flange on one side; and these flanges were placed right and left alternately. Unfortunately, however, as I have already stated, some of these pulley-wheels had a good bit of play, due to underground workings. The level of the water in the tank shows that it has sunk 6½ inches on the north-west side. We tried the guide-runs for plumbings, and found them to be: Column 3, 4½ inches to the right; and column 4, 2 inches to the left. As there are two rows of lattice girders and diagonal wind-ties, it is quite natural to suppose that the columns would lean towards the low side in a consistent manner; and this most of them do. Yet it is difficult to account for columns 3 and 4 being in their present position—assuming, of course, that they were perfectly plumb when they were erected; and I have no evidence to lead me to believe otherwise.

The following morning, I got four sets of pulley blocks from the nearest colliery, and attached one to each alternate column, and fastened the lower hook to a chain slung around the top carriage of the inner lift immediately opposite. When the holder was uncupped, by adjusting the tackle at the different points as the lift was rising or lowering, we managed to keep it fairly vertical. This necessitated the constant attendance of at least one man both night and day. Next day I resolved to try and get it back to its original position; so I obtained another two sets of rope blocks, and fastened them in a horizontal position—one set on column 3, fastened to the carriage opposite column 1, and the other set on column 7, fastened to the carriage opposite column 5. Pulling gradually, we got it round about a foot; but further than this it would not go. There was no drawing of the holder to show its internal construction; so I could only surmise that the bottom rollers on the inner lift were jamming against the vertical stays of the outer lift. But what kind of rollers they were, or whether the vertical stays were flat bars or channel irons, I had no idea. The holder was a second-hand one, re-erected at Kelty about 6½ years ago.

The erector of the holder was sent for; and in the interval we had just to work away with the tackle to keep the lift as vertical as possible. Another difficulty arose when the holder was cupped and up about 5 feet. The seal began to blow. This was due to the holder leaning over to the low side, and the water ran out of the cup. We got over this by laying a row of bricks on edge and bedded in cement, nearly half way round along the top channel of the outer lift; thus raising the seal. The erector informed me that the vertical stays on the outer lift were flat bars 6 in. by ¼ in., and that the rollers were plain ones. There could therefore be very little holding the lift back. On the Sunday, we again tried to pull it round by means of the tackle, and inserting wooden rollers in the cup to squeeze in the parts that were catching; but after several hours' work, we were no further forward. I had, therefore, to devise some other plan.

A few days after, a long chain was put round the body of the inner lift about 10 feet from the top, and a set of tackle attached. The gasholder was kept about 2 ft. 6 in. from being cupped. Special pieces of iron were made to reach down between the cups to ease off the rollers that were jamming. With the aid of these and wooden props, the lift was brought to its original position. Previous to this being done, we had to consider some means of engaging the top lift with the main vertical guides, as most of the cast-iron carriages had got broken. Angle pieces 3 ft. by 4½ in. by ⅞ in. were made, and then bolted on to the cast-iron sole plate and wedged up after the lift had been righted. The staff of the Fife Coal Company and our own men carried out the work under the most wretched conditions—a heavy pitiless rain falling all the time; and I am much indebted to them, especially to the Coal Company's Engineer, Mr. Robertson, for their valuable assistance. I was left at four o'clock that Friday afternoon with about 25,000 cubic feet of gas in the holder; and the output for the twenty-four hours ending six o'clock on Saturday morning was 96,000 cubic feet. I am glad to say that I managed to maintain a full supply until 9.30 p.m. Only between that hour and 11.30 was the pressure reduced to 20-10ths.

The guides have been kept well greased; and the lift has since worked up and down very smoothly. As showing this, about a month ago, owing to the lighter demand, the holder was nearly full just before dusk, when apparently at the low side the outer lift, which has very little clearance between the first row of girders, had jammed for a few moments. This lowered the seal in the cup at the high side, with the result that the gas blew out. I ordered the stoker to put out all the lights on the works, and had the mortifying experience of seeing 30,000 cubic feet of gas blowing into the air. The holder came down without a hitch of any kind. Fortunately, the wind was blowing in a safe direction.

In the coming summer, the work of plumbing the guides, columns, and fixing new carriages will have to be undertaken; and should my Directors not decide to put up another holder, the repairs will have to be carried out while the holder is in action.

The PRESIDENT said the members all sympathized with Mr. Rule, who must have had a very anxious time. A holder was not only a very important thing in gas-works, but it could be the cause of a great deal of danger. He thought Mr. Rule showed a good deal of ingenuity in getting over his difficulty. The members were all indebted to him for his paper and for his illuminating blackboard illustrations.

Mr. R. J. PHILP (Polmont) then read the following paper on

VERTICAL v. HORIZONTAL RETORT-SETTINGS.

Doubtless you are all aware that the Dunfermline Corporation Gas Department decided some time ago to erect vertical retorts. The Engineer and Manager, Mr. A. Waddell, after due consideration of the respective merits and initial cost of the various settings on the market, decided himself to design a setting. During the preparation of the plans (in the designing of which it was my privilege to assist), various points arose which I deemed might prove of interest to the members of this Association.

THICKNESS OF WALLS.

Vertical retorts, while a modern innovation in gas-works, are of comparative age in oil-works. It, therefore, follows that their experience should be our gain. In the early stage of the vertical retort in shale-oil works, the walls were relatively thin, and less in height; but the outcome of experience has proved that increasing the walls to the necessary thickness, to prevent loss of heat by radiation, amply repaid itself by the considerable saving in fuel. The hand may be placed with comfort on the walls of a present-day shale-oil setting; but what a remarkable difference is presented in the case of the present-day horizontal gas-retort setting! The excessive loss of heat in this manner in the case of horizontals, owing to the front wall being necessarily limited in thickness, is a factor of considerable moment in favour of vertical retorts, and one which should be taken advantage of. The extra cost of adding 18 inches to the thickness of walls would be about £45 per setting of four retorts; and interest and sinking fund over 15 years would amount to an annual charge of £4 or £5. Another aspect of this question is that, with the extra thickness of walls, the necessity of heavy and extensive binding is reduced to a considerable degree, and, consequently, the extra cost entailed by the increased thickness of walls is correspondingly reduced. No member present, I am sure, would require to give a second thought to be convinced that the monetary value lost through radiation must be very great; and just consider what the cost would be to heat the retort-house to the temperature usually attained in that building.

TRAVEL OF HEATING GAS.

The difficulty of utilizing the maximum amount of heat in the generator gases of a horizontal setting is well known, owing to the gases having a comparatively short travel. The time-contact, travel, and area for combustion of the gases, and absorption of their heat, is very marked in vertical settings compared with horizontals; and it will be readily admitted that the saving in this direction is another material point in favour of the vertical. Under the heading of thickness of walls, I mentioned that the shale-oil works had found it advantageous to heighten their retorts. The gain in heat efficiency by so doing is evident when the above remarks are taken into consideration. There is also the advantage of the saving in ground space; and, where conditions permit, the adoption of a retort of considerable height is, undoubtedly, the most economical policy.

ARRANGEMENT OF RETORTS IN A SETTING.

In a setting of vertical retorts, the support obtained from the outside walls depends upon the number of retorts in each setting. The greatest amount of support supplied in this manner is in a setting of two retorts. In this case, support is obtained on three sides of each retort; while in a setting of four retorts, two sides of each retort are supported. Any retort added to a number above four, the ends only are supported on two sides. The most advantageous arrangement, therefore, is a setting of four retorts, inasmuch as support is obtained on two sides, and the proportionate amount of exposed surface is less than in a setting of two retorts. Suppose a setting of eight retorts, making 40,000 cubic feet. This setting alone would be ample for the maximum make of many works. Should this setting give way, through any unforeseen cause, the difficulty the works would be in is at once apparent, unless, of course, a duplicate setting was provided. Again, the excessive idle capital would here be a stumbling block. But, suppose the settings were arranged in ovens of fours, then the risk is reduced by half. This applies also in case of extensions.

This is of special interest as regards the adoption of verticals in small or medium-sized works. This arrangement is opposite in the case of horizontal retorts. The greater the number of retorts in a setting, the more economically they can be heated. Now this does not tend to favour small or medium-sized works to the same extent as it does a large works, where the retorts in a setting number as many as twelve, owing to the cost of an installation of machinery necessary for charging and discharging, and the large production of a setting of twelve. Another important item under this heading which is well worth notice is that, should a retort in a vertical setting give way, one retort only is affected; whereas, in a horizontal setting, should one retort give way, it in many cases affects a considerable portion of the setting.

CAKING AND NON-CAKING COAL.

In horizontals, this item does not to any extent make much difference; the usual practice being to work the coal nearest the works. With verticals, however, the kind of coal is an important factor. Those of you who have visited a coke-oven will have observed that the coke forms a solid mass. Apply this to a strong caking coal as commonly used in England, but to a much less extent in Scotland, in a vertical retort. The result is that the coal, dropping upon the hot mass already in the retort, cakes, forming a solid mass through which the gas would with difficulty travel. Consequently, the gas naturally takes the easiest course —to the outlet pipe, which, owing to the shape of the retort, is between the hot mass and the side of the retort. The detrimental effect of this on the quality of the gas, as well as the tendency to form carbon on the retort-walls, is well known to you. The inclination of the coke to "hang" is also a disadvantage of a strongly caking coal. We, in Scotland, are, therefore, more favoured in this respect than our brethren in England.

GENERAL.

In a case where it becomes necessary to extend the carbonizing plant, with the continuation of horizontals, it would be impossible to do so without also extending the retort-house. Then the advantage to be derived from an installation of vertical retorts at once suggests itself. With a setting of eight retorts, 22 in. by 16 in. by 9 ft. long, an area of about 130 square feet is required. This would carbonize 132 cwt. of coal, or one cwt. to each square foot per diem (four-hour charging). Suppose a setting of twelve were introduced. This would occupy the same space; and works out at 1½ cwt. of coal per square foot per diem. Now, a setting of four verticals would occupy an area of about 225 square feet, and deal with 320 cwt. of coal per day, or 1½ cwt. per square foot, and would be as effective as a setting of twelve horizontals.

Consider, now, the space necessary for drawing and charging retorts. This space requires an area at least equal to the width of the bench, or, in other words, owing to the charging and discharging apparatus above and below the setting, two settings of verticals may be put down on the same area as one setting of twelve horizontals, and be twice as effective.

It is not necessary to elaborate the various points to be said in favour of verticals as regards decrease in the charge for labour, which is less arduous, and very much more hygienic, owing to the absence of smoke, coal dust, and very little (if any) steam. There is also the decrease in water charges, saving of time necessary for the drawing and charging of horizontals, absence of leaking doors, and freedom from choked ascension pipes. There is also the greatly increased yield of gas per ton of a more uniform quality, a larger amount of tar per ton of a more suitable composition, and a better return as regards coke.

In conclusion, I am of opinion that before long vertical retorts will be installed in most gas-works, at a considerable reduction in the present-day excessive initial cost.

Discussion.

The PRESIDENT said they were all indebted to Mr. Philp for his valuable paper, which was on a subject that was occupying the attention of gas managers at present. Such a paper showed that the Junior Associations were to keep up to date.

Mr. R. DUNLOP, who was welcomed by the President as one of the pioneers in the oil trade, made an interesting contribution to the discussion in regard to the use of vertical retorts in oil-works. He remarked that it was nearly thirty years since these retorts were introduced to the local oil-works; and he could not understand why gas managers had not paid more attention to them than they had done. From the very beginning of their introduction it had been found that there was no difficulty in making gas in these retorts; and he was of opinion that better results would be obtained from them than in horizontal retorts—alike in the quality of the gas and in the coke. Referring to the high heating of vertical retorts and the consequent deposit of naphthalene, while he did not indicate how the latter trouble could be avoided, he thought it was not beyond the skill of gas managers to so regulate the heat that the naphthalene would not be so much in evidence. In this connection, he thought that if the retorts were built on the principle of cells of about 2 feet, as they were in oil-works, and with a little hole in the side of each, which could be stopped up with clay to control the inflow of air, and so regulate the heating, better results would be obtained. He also favoured the building of the retorts in brick instead of iron. Just as the oil iron retorts were discarded for brick, he was of the opinion

that in gas-retorts the same good results as were obtained in the oil industry would be obtained.

Mr. A. WADDELL (Dunfermline) remarked that the oil-works people left the horizontal retort because it made too much gas, and the gas people were leaving the horizontal retort because it made too little. They were pretty well satisfied with everything that had been said about the vertical retort, which had come to stay; and he was thoroughly at one with Mr. Dunlop in what he said about its not having been introduced sooner. A good deal could be learned from oil-works; and he remarked that, at a meeting of the North British Association, he had mentioned how cheaply they could handle material in them as compared with gas-works. In oil-works, they could handle the shale, from the time it came out of the pit until it was put on the rubbish heap, at 2¾d. per ton. When vertical retorts were more introduced and better understood, perhaps some attention would be given to this aspect of the question. The regulation of the heating would, he thought, yet be overcome.

Mr. RULE (Kelty) said he was not in a position to go in for vertical retorts, because his works were too small; but it was none the less nccessary to keep up to date in this particular. Mr. Philp had mentioned that the labour charges would be reduced very considerably by the introduction of vertical retorts; and he believed in actual practice this would be the case. His prime test for the adoption of vertical retorts would be the reduction of labour. They all knew what the country was going through in connection with strikes; and he thought the sooner gas departments were in a position to do with as little labour as possible, the better would the supply of gas be safeguarded.

The PRESIDENT alluded to the reference to eight retorts in Mr. Philp's paper. He thought it would be better to have two different settings of four retorts. It was unlikely that the eight retorts would be working summer and winter. He did not think vertical retorts were suitable for small works, as they would require to have elevating plant, which would make the introduction of them prohibitive. Horizontal retorts would, he thought, hold their own in small works for a long time, although he was perfectly convinced that the vertical retort was the thing of the future for large and medium-sized works.

Mr. PHILP, in reply, said he only took the setting of eight retorts as an illustration. As a matter of fact, he was advocating benches of four.

A JOINT VISIT TO ALLOA.

Mr. GEDDES, the Hon. Secretary, announced that the next meeting would be held on the 30th inst., at Alloa, when they would have a joint visit with the Western Section to the gas and electricity works.

The members of the Association were subsequently entertained to tea in the Royal Hotel; Mr. Waddell being the host. The President presided; and at his call a hearty vote of thanks was accorded to Mr. Waddell. The President spoke of Mr. Waddell's interest in the Junior Association, and how he had always been willing to help them. Mr. Waddell, in reply, returned to the need there was for paying more attention to oil-works than was done by gas managers. He thought the Junior Association was setting the Senior members of the profession a good example in moving about so much as they did, as such meetings as theirs in different centres was bound to be productive of a great deal of good to the members. The Hon. Secretary also paid a warm compliment to Mr. Waddell for his great kindness.

Presentation to Mr. Ernest Collins.

Last Tuesday evening, a large number of officers of the Metropolitan Water Board met in the old Board Room of the offices of the late New River Company, at New River Head, in Rosebery Avenue, for the purpose of taking a formal farewell of Mr. Ernest Collins, M.Inst.C.E., until recently the Engineer for the New River district, and formerly one of the Chief Engineers of the New River Company. Mr. Collins had been in the service of the Company and the Board for some thirty-one years, and had gained the universal respect and esteem not only of the Company and the members of the Board, but of the whole of the officers and workmen, irrespective of class or grade. In recent years, he took a prominent part in urging the claims of the officers of the Water Companies who were transferred to the Board in 1904 for fair and equitable consideration in connection with a number of difficult points which almost necessarily arose upon the amalgamation of eight commercial companies under one municipal body. His tact and discretion, combined with his urbane and kindly character, enabled him to secure a number of concessions in the interests of transferred officers; while he speedily earned the highest opinions from the officers appointed by the Board itself. The esteem in which Mr. Collins was held throughout the service took the form of a solid silver salver, engraved with his coat of arms, and suitably inscribed. The presentation was made by Mr. H. F. Rutter, M.Inst.C.E., the Board's Western District Engineer, in a very happy speech, to which Mr. Collins replied in terms which did not attempt to disguise the emotions he felt upon receiving such a testimony at the close of his professional career in the room where, more than thirty years ago, he received his appointment from the Directors of the New River Company.

SCOTTISH JUNIOR GAS ASSOCIATION.

WESTERN DISTRICT.

A Meeting of the Western Section of the Scottish Junior Gas Association was held in the Glasgow Technical College on Saturday—the PRESIDENT (Mr. James M'Ghee) in the chair.

At the outset of the proceedings, the PRESIDENT referred to the recent changes of position among the members, and especially to the appointment of Mr. Mason as Secretary of the British Commercial Gas Association. He said it was both a high tribute to Mr. Mason, and to the training he had received in the Gas Department of the Glasgow Corporation. It was agreed to send Mr. Mason the congratulations of the Association.

Mr. GEORGE DONALDSON (Glasgow) read a paper on

SHOW-ROOM PRACTICE.

At the outset, the author remarked that in submitting his paper he would endeavour to indicate how, in his opinion, a large gas show-room should be conducted; and he explained that the suggestions made and the facts quoted were based on experience gained in what was acknowledged to be one of the best-equipped and most up-to-date permanent gas exhibitions in the United Kingdom. He then proceeded as follows.

Show-room practice is not confined merely to the inside of the shop. It begins, or should begin, outside, first of all, among the employees of the gas department who are coming into more or less direct contact with the general public—viz., the district foremen, meter inspectors, collectors, canvassers, and indeed all connected with the concern. These should be living avenues for bringing business to the show-room, where, if properly handled, it is eventually turned into profit and benefit to the whole gas undertaking. In the accomplishment of this ideal, much serious attention and thought are essential, besides continuous exertions in opening new channels, and in initiating fresh inducements tending to an increase in business.

The show-room itself should be a centre of attraction, able to attract the public, arouse interest, and show that the department is run on business lines, instead of being merely an ornamental nonentity with little real power in the community. Although a corporation department cannot, as a rule, like a private company, adopt certain methods of advertising, there are still many lines of attraction which can be brought to bear in securing business. A most important point is the outside appearance of the show-room.

WINDOWS.

The windows should be large and well stocked with appliances. From the great variety of articles now available, there is no reason why an excellent display cannot be made to attract all classes of the public. Fittings should be exhibited dealing with, at least, the following sections: Lighting (domestic and factory), cooking, heating, and power. Under each of these sections, interesting, useful, labour-saving, and economical types of apparatus are available, many of which only require to be shown and have their merits explained to ensure their adoption. Cards quoting economies effected, prices, &c., should also be displayed; and special attractions, such as those exhibited in the windows of the Glasgow Corporation show-rooms in Sauchiehall Street, of cooked articles of food, prove excellent mediums of advertisement, even if they have sometimes to stand the fire of adverse criticism.

THE SHOW-ROOM.

Inside the show-room, a large and varied stock of cookers, gas-fires, gas-heaters, and other modern gas apparatus should be kept. It is one of the justifications for a corporation department undertaking such work at all that the private trader cannot possibly be expected to hold such large stocks as a public department; and it should not be forgotten that such a department has its duty to the gas consumers as well as to the private trader. It is a well-known fact that no private firm in Glasgow has anything like the stock of gas apparatus contained in the Sauchiehall Street shop; and much of the success which has attended the pushing of gas-fires, radiators, and water-heaters is due to the fact that we have been able to show a great variety of apparatus suitable for practically all tastes and purses, and also that these can, as a rule, be delivered without much delay.

MODEL ROOMS.

An essential feature of the modern show-room should be a permanent exhibition of furnished rooms, so fitted up that customers can see how fires, burners, and other appliances, look under ordinary household conditions. These should be set out in such a fashion that the show will be as a picture to be looked upon with approval, and meet the best taste. The appliances should be fitted so that members of the staff can easily give practical demonstrations of working conditions at a moment's notice. The model rooms undoubtedly prove a great aid in business, especially the kitchen, where cooking appliances are demonstrated with, and where at certain intervals special lectures are given on their use. These demonstrations have proved a wonderful success in Glasgow; and they continue to attract large numbers of customers, who freely bear testimony to the benefits they have received from the hints given. In the rooms not only is it shown how gas can be used for lighting and heating, but the best styles of fittings and general arrangement are also made clear. The furniture can generally be had on loan,

as a good free advertisement is given to the firm supplying the goods on exhibition.

Duty of the Staff.

I will now consider the actual dealings with customers; the duty of the staff being to give information and advice regarding appliances, and to induce the public to adopt apparatus on sale outright, on the hire-purchase system, or under the "free" loan arrangements. The gas-fire is perhaps the appliance which is looked upon with most suspicion by the public, even though its cleanliness and labour-saving qualities are fully recognized; and the show-room attendant must be possessed of both intelligence and tact, not to mention patience, to enable him to answer the many peculiar questions on the subject which are continually being put. The gas consumption, heating capacity, price of fittings, conditions of hire-purchase, and hygienic qualities are some of the common points respecting which information is wanted. The same may be said with regard to radiators and water-heaters, and, though not to the same extent, to cooking appliances. Gas geysers and water circulators are rapidly coming into more general use, owing to the saving in expense and attendance. The geyser is suitable where no hot-water system exists; and a circulator is necessary if the kitchen range, with the usual back-boiler for heating water, is to be discontinued or replaced by a gas-cooker.

Card Systems.

For dealing with the various transactions in our show-rooms, we have adopted card systems, which, after being modified and altered as occasion demanded, have been found to work most satisfactorily. Sales, hires, hire-purchase, complaints, stock, and maintenance are all dealt with, and, as far as possible, each card or line has a distinctive colour. [The author showed and described a number of the cards referred to.]

We consider our present method of working simple and effective. Of course, after all, everything depends on the human element, as the best system in the world would be a hopeless failure if not intelligently worked. I trust that the facts submitted may be useful, not only in making our general scheme of working intelligible, but in guiding other undertakings who may contemplate similar systems of working.

Discussion.

The President said they had heard a very good and intelligent *résumé* of the method in which the business was conducted in the Glasgow Corporation show-rooms. The author had mentioned the fact that meter inspectors, clerks, foremen, and every man connected with the establishment ought to be a living avenue to attract business to the show-room. Regarding the matter of canvassers, he (Mr. M'Ghee) found that it had always been a vexed point. He was not greatly enamoured of canvassers. Their energies were good at the beginning; but they had a tendency to flag, more especially when they got into a fixed business. With reference to their meter inspectors, these men were all over the city, and many of them became, as it were, friends of the family. So frequently were they in the houses, that they were well-known, trusted as a rule, and their advice was very generally asked. He thought it would be advisable for the Corporation to introduce a bonus scheme to these inspectors. They had been approached in many places to stimulate orders for gas-fires, &c.; but as a rule, they generally claimed that they had sufficient work to do without attending to canvassing. If something were offered as an inducement for every order secured for a new gas appliance, he was certain that they would be able to squeeze a little more into their time. The author had alluded to the kitchen in the show-rooms. This was a very good idea. It had attracted a goodly crowd of ladies; but an observant manager would notice that the same faces were seen at all the lectures. He considered that a greater and more permanent work could be carried out by having a lady demonstrator in the show-rooms. In the light of greater extension and of the interest in power apparatus, it was becoming a necessity to have attached to the show-rooms a room set apart for furnace, annealing, and other appliances. It might be somewhat unwieldy attached to the show-rooms; but in the workshop in Wall Street, they had had several visits from foremen and engineers attached to other establishments.

Mr. Wilson (Falkirk) speaking of the cooked food shown in the windows, advised Mr. Donaldson, in view of certain criticisms, to put into the window only such stuff as would not be subjected to ridicule. The otherd ay he heard about the food shown in the Corporation show-rooms; and the remark was that certainly it was not an advertisement for the gas-cookers. This would not do. They must have the best of food shown. Referring to the card system as a check, he said that on its numerical side it allowed the department to trace the appliances—into whose hands they went. They must also have the alphabetical list to know just what cooker the consumer had got. Sometimes a consumer removed and left the gas-cooker in an unsavoury condition. She applied at the gas office and got a new one. This was not quite good enough. The card system had come to stay. It was the most simple method of working in a large concern.

Mr. Donaldson, in replying to the discussion, said, with reference to the remarks on the food shown in the window, that the first experiments were not altogether satisfactory; but by this time there was no cause for complaint.

The Hon. Secretary (Mr. D. Fulton) added that in any shortcoming it could not be the fault of the gas. The cook should be improved upon. As for the card system, it seemed to him much too involved.

AMERICAN COKE-OVEN TARS.

The rapid increase in the use of refined coal tar for highway improvements led the United States Office of Public Roads to send a letter to the owners of a number of American bye-products works and retort coke-ovens, asking for information concerning certain features of their manufacturing processes and for a sample of their crude tar. These requests were answered by all but one of the owners; and a summary of the results of the investigation, prepared by Mr. Prévost Hubbard, has lately been made public. The following particulars are from "Engineering Record."

Reports relative to the maximum temperature to which the coal is brought during distillation indicate that two of the plants run below 970° C., that a total of twenty-two run not over 1150° C., that nine run from 950° C. to 1150° C., and only five run above 1150° C. The maximum temperature for firing the retorts is reported in most cases as being higher than the maximum temperature to which the coal is brought. The maximum percentage of free carbon reported is from 16 to 24 per cent.; but seventeen manufacturers reported the maximum percentage of free carbon as 12 per cent. or less, and only four as 16 per cent. or more.

The specific gravities of the samples examined range from 1·133 to 1·214; and the great majority are lower than 1·2. This in itself indicates low percentages of free carbon. The minimum percentage was 2·73; the maximum, 16·80; and the average for the 26 samples 8·38. Eighteen samples contained less, and eight more, than 10 per cent. of free carbon. About two-thirds of these products might, therefore, be considered as low-carbon tars, and the other third as medium-carbon tars. The amount of ash in no case exceeded 0·16 per cent.; in most cases it was practically *nil*. This is, of course, also true of nearly all gas-works coal tars. The percentage of water present varied from a trace to 10·1 per cent. by volume; but in only three instances did it exceed 5 per cent. Fourteen of the pitch residues remaining after distillation had been carried to 315° C., were either soft or plastic—a condition which has seldom been noticed by Mr. Hubbard in the distillation of gas-coal tars. The amount of solids which crystallized or precipitated out of the different fractions was found to vary greatly. Wide variations exist in the relation of total distillate to pitch residue; and this is even true of different tars produced by the same type of oven.

Straight coal tar road binders or refined coal tars are usually manufactured by subjecting the crude material to a process of distillation with or without steam or air agitation. Distillation is carried to the point at which the residuum remaining in the still has obtained the desired consistency at normal temperatures; and this involves the removal of certain of the more volatile oils present in the crude material. For use in construction work, a soft and almost fluid pitch is often produced; and the consistency of this pitch is controlled by means of a melting-point or float test. When the crude tar runs abnormally high in free carbon, it is sometimes mixed with crude water-gas tar before distillation. This tar contains a very low percentage of free carbon; and by properly proportioning the two, a product is obtained, upon distillation, which does not carry more than the maximum limit of free carbon set by manufacturers.

Mr. Hubbard points out that what the maximum limit should be is a much mooted question among those who have given attention to this matter. The governing considerations are: (1) What is the most economical limit from the standpoint of manufacture? (2) What is the proper limit with regard to the utilization of the product as a road material? For a number of reasons, he states, an excessively high-carbon tar is difficult to distil properly; and, with other things equal, the lower the percentage of carbon, the easier and shorter the distilling process. From this standpoint, therefore, bye-product coke-oven tars are well adapted to the manufacture of road binders. Moreover, because of their low percentage of free carbon, they may be employed in a manner similar to water-gas tars, when it is desired to utilize a crude high-carbon tar in the production of a medium-carbon tar road binder.

In an ordinary road tar for use in construction work, where free carbon is present to the extent of about 20 per cent., the proportion of total distillate, below 315° C., to pitch residue is approximately 1 : 4. Where this relation exists, the pitch residue is hard and brittle. A residue which is soft and plastic is to be preferred, as it would indicate longer life during service; and where such a residue is present, the proportion of distillate would naturally be lower for a given consistency, as the distillates may be considered as fluxes for the residues. If this is the case, coke-oven tars offer a valuable source of supply for tar road-binder materials.

Improving the Paris Gas Supply.—According to an announcement in the "Official Gazette" last Thursday, authority has been given to the Paris Municipality to raise a loan of £8,200,000, in order to improve the gas supply of the city. It is to bear interest not exceeding 3·6 per cent., and be redeemable within forty years from the date of raising it.

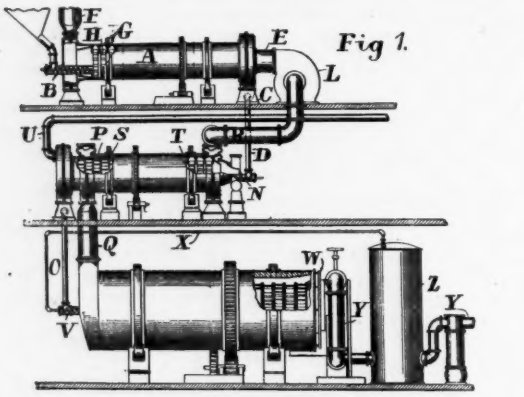
CONTINUOUS PRODUCTION OF COAL GAS AND WATER GAS.

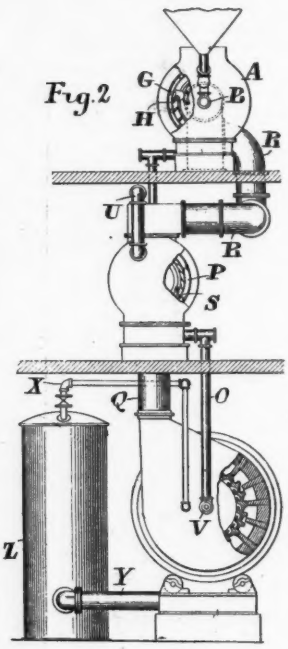
The General Reduction Gas and Bye-Products Company of America have taken out for several countries patents for a process and plant for the treatment of various materials suitable for the continuous production of coal gas and water gas. The application for the English patent is under consideration; but a patent has been granted for France, and the following particulars have been translated from the French specification.

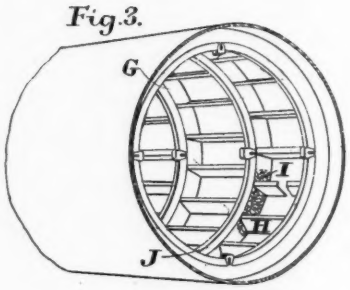
The object of the invention is a method of treating various materials with a view to changing them by subjecting them to the action of certain agents at particular temperatures, and also the construction of apparatus for obtaining the products of such treatment in a solid, liquid, semi-liquid, or gaseous condition. The invention is specially applicable to the treatment of such materials as sugar, starch, salt, milk, coal, lignite, peat, sawdust, petroleum, tannic acid, molasses, minerals of various kinds, and a large number of other substances, when it is a question of removing humidity, concentration, evaporation, crystallization, fractional or total distillation, purification, or transformation, or effecting physical, mechanical, or chemical change.

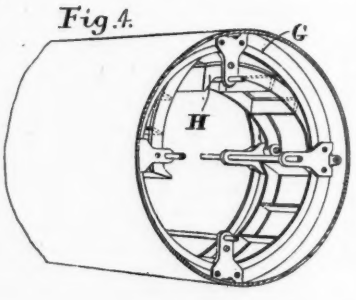
In employing the process, by means of the improved plant, for extracting combustible vapour from carboniferous substances, coal gas can first be extracted, and then the carbon of the non-volatile residue, or coke, converted into water gas—thus changing the combustible elements of the coal into gaseous products. The coal gas and water gas are both produced continuously, and without any appreciable intervening cooling of the coke. Owing to the continuous charging and drawing of the apparatus, which for the manufacture of gas is kept permanently closed, and also to the employment of a heating fluid, without any contact with the materials, it is claimed that a much greater percentage of gas and bye-products can be obtained than has hitherto been possible. The process and plant also permit of the treatment of carboniferous substances at such low temperatures that the economy in bye-products thus realized is very considerable, though, when necessary, either high temperatures or those most suitable for attaining the end in view can be employed, owing to the immediate and intimate transfer of the heat to the materials under treatment. The heat is, in fact, transmitted directly to the particles, and not given off by conduction in passing through a layer of transformed or partially transformed materials, or transmitted in variable degrees of intensity through the interstices which may happen to exist in an inert mass of materials merely divided into relatively large pieces or blocks. Other advantages claimed for the process and plant result from the employment of the same heating gases to transform the coal into coal gas and water gas, in order to separate the bye-products; also from a gradual utilization of the heating gases by running them through several zones which require decreasing temperatures, and from the preservation of these temperatures in the different zones to suit the various successive treatments.

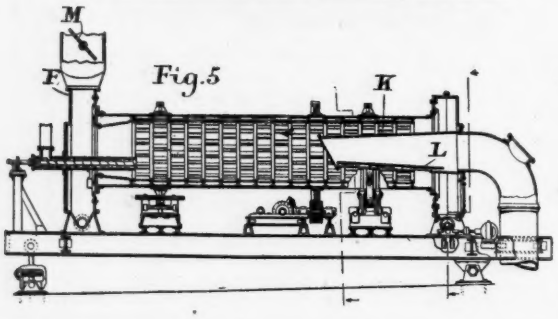
The plant is shown in the accompanying illustrations. Fig. 1 is a side elevation and fig. 2 an end elevation of the apparatus. Figs. 3 and 4 are sections of parts. Fig. 5 is a section of a modified form of the apparatus.











The receiver A (fig. 1) is provided with a hopper terminating in the feeder B. At the outlet end of the receiver is an opening C, communicating with the discharge-pipe D. The pipe E, at the end of the receiver, is for the introduction of the drying or treating agent, such as air or hot gas; and the opening F is the gas outlet. Ribs or annular baffles G are arranged at intervals in the receiver; and in the spaces between them (preferably in each one) there are distributing chambers or recesses H, shown clearly in figs. 3 and 4. The height, spacing, and form of the ribs and chambers may vary to suit the kind of material being treated. The receiver is inclined from the charging to the discharging end; the angle of inclination being varied as desired. Upon the ribs are surface pieces or annular baffles I (fig. 3), furnished with grooves to receive the ends of the chambers. The treating agents to be employed can be run into these grooves, and secured by means of bolted hoops J.

In the modified form of the receiver shown in fig. 5, the supply-pipe K for the treating agent projects into the vessel. This pipe can be suitably heated and insulated; and it is provided with dampers L on its circumference, whereby the inflow of the agent can be regulated both in quantity and as regards points of admission. The damper M regulates the area of the passage, so as to control the speed of the agent passing along, and the time during which it is in contact with the materials.

The middle receiver has at the charging end a feeder N, and at the opposite end a nozzle leading to the discharge-pipe O. The heating flues P receive the gases from the pipe Q and the pipe R, which is connected with the inlet-pipe E of the receiver A, through the agency of the jacket of the fan. On the cylindrical inner wall of the middle receiver there are mixing paddles or troughs S and annular baffles T. The pipe U is for the outlet of the gas, and it can be placed at one or both ends of the receiver, and run to some suitable vessel. The outlet-pipe O leads to the feeder V at the charging end of the bottom receiver. The heating flues, as shown in fig. 1, are laid over the inner wall of the vessel, and they can be supplied with hot gas by burners at W. From the flues the gases pass through the pipe Q to the middle receiver. The pipe X is for supplying steam or other agent, which enters the bottom receiver, preferably at its charging end. The gas outlet-pipe Y, placed preferably at the discharging end, passes through the boiler Z, where its heat is utilized to produce steam; and the gas flows away thence through the outlet-pipe. All the receivers are preferably fixed in an inclined position from the charging to the discharging end.

To utilize the invention, more especially as regards the treatment of carboniferous substances, the materials are put into the top receiver through the hopper and the feeder B; and they must there be dried and partially heated. As this receiver is preferably slightly inclined towards the outlet end, the materials move forward owing to the rotation of the cylinder, and pass out through the opening C and pipe D to reach the feeder of the middle receiver. The drying agent—preferably air or hot gas—is conveyed through the pipe E, and draws out the humidity to be removed from the materials when leaving the receiver through the opening F. The rotation of this top receiver and the action of the

compartments H produce a continually repeated mixing of the materials in the air or hot gas, and dry them thoroughly; while the ribs G prevent them passing too rapidly through the receiver. The heated materials enter the middle receiver at the charging end; and as the vessel is inclined from that end to the other, they move forward and are kept in a finely-divided state by the rotation of the receiver, the mixing produced by the compartments S, and the action of the annular baffles T.

The middle receiver is heated by the gases passing through the pipes D; and as the materials are continually thrown against the inner side of the cylinder, they are quickly brought to the temperature of gasification. The gas thus produced, and also the resulting bye-products, flow away through the pipe U, and thence into a vessel for supplementary treatment. The residue from the materials used passes into the feeder V. As this is inclined from its charging to its discharging end the rotation of the cylinder carries the materials towards the outlet, and they are continually thrown against the sides of the receiver, which is heated by pipes. The residue can be removed at the discharging end in any suitable manner. Impingement against the heated surface is facilitated by the chambers shown at the opening in the bottom cylinder; and the temperature of the materials rapidly increases to the required point, which for water gas is above 870° C. (1600° Fahr.). The steam for making this gas is introduced through the pipe X, and the gas is drawn through the pipe Y and the boiler *Z* into a suitable receptacle. To render the gas fit for lighting purposes, a fluid hydrocarbon or other enriching material can be introduced with the coke or the steam, or separately. The materials to be treated pass through a series of rotating vessels in the opposite direction to the hot gases. Thus the heat is utilized in the best manner, as the final operation of the process requires the most intense heat; and the preceding operations utilize it at temperatures which decrease until the gas is discharged sufficiently cool to yield the most economic results in working. Conversely, the temperatures gradually increase from the entrance of the materials to their exit from the various receivers, as do also the average temperatures of the latter. The temperature of each receiver is regulated so as to ensure the greatest efficiency, from the point of view of temperature, in the various phases of the process and parts of the apparatus.

The theoretical temperature for the production of coal gas is approximately 400° C. (752° Fahr.); while that of the dissociation of ammonia is 500° C. (932° Fahr.). The average actual production of ammonia in the manufacture of coal gas is from 14 to 15 per cent. of the theoretical yield. This loss is due to working at a temperature above 500° C.—an essential condition for a gas-works where the usual methods are followed. With the improved process and plant, gasification can be completed to distil nearly all the volatile matter in the coal at a temperature less than that just named; so that the theoretical yield of ammonia is more nearly attained. The volatile matter left in the coal will be liberated in the form of a permanent gas, once treated in the bottom receiver, at higher temperatures, where it serves to carburet partially the water gas formed. Thus materials can be treated at lower temperatures than are at present commercially possible; and loss of valuable products by overheating is avoided.

The process and plant described can be utilized to treat gases by the aid of solid or liquid reagents, in presence of heat or otherwise—for example, to purify illuminating gas, or to change carbonic acid into carbonic oxide. Different parts of the apparatus can be utilized for the treatment of a great variety of substances; and, in the case of certain materials, treatment in only one of the receivers may suffice.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

"Doubting Thomas"—Eighteen Years Afterwards.

SIR,—In reference to a statement made by Mr. Thomas Wilson, of Coatbridge, at a recent meeting of the Western District of the Scottish Junior Gas Association, published in your last issue, which reflects on my former authentic work, I desire to say that the statement I refer to—viz., "I question if Mr. Ewing has ever seen 25-candle gas"—is absolutely without foundation, and was made by Mr. Wilson in his usual jocular manner, and left as such. However, the innuendo is far-reaching, and to say the least undeserved, in view of the fact that cannel coal and shale of good quality were used in the manufacture of nothing but good quality of gas.

Therefore I would suggest that Mr. Wilson, who has the honour of selling the cheapest gas in Scotland—now about half the former price of gas in Coatbridge at the date referred to, 1893-4 (though, in my opinion, Hamilton still maintains the honour of making the cheapest gas in Scotland)—should read the "Reports of Gas Associations for 1898," the year when he was President of the North British Association of Gas Managers, and when, at his request, I wrote a paper on "Retort-Settings and Working Results," and the comments thereon.

He will there find an authentic record of work economy and results obtained under trying conditions and nearly insuperable difficulties, and the making of gas at a penny per candle with a margin to spare.

A comparison of Coatbridge and Hamilton would be instructive to the members of the Junior Association, and then the truth would be told.

Lochgelly, March 5, 1912. WM. EWING.

Gasholder Lutes Syphoning through Steam-Injectors.

SIR,—It is interesting to learn from Mr. J. van Rossum Du Chattel's communication to your "Correspondence" columns in the "JOURNAL" for the 27th ult. the means he has adopted for preventing the syphoning of the water from gasholder lutes through the flexible steam-tubes attached to the injectors, arising either from a flooding of the injector and its connection, or, as is more often the case, in consequence of the condensation of the remaining steam in the tube, after the supply is shut off, creating a vacuum sufficient to draw over the water.

I adopted a similar device after the incident referred to in my former communication; and, not only does it prevent the syphoning due to whatever cause, but the slight escape of steam enables one to observe from the ground level whether each and all of the injectors are in proper work. A pin hole drilled through a white-metal plug seems to remain clear and effective without attention.

Palace Chambers, Westminster, March 6, 1912. W. R. HERRING.

Gasholder Guide-Framing.

SIR,—We notice Mr. Miller's reference to our guide-framing in the "Correspondence" columns of your issue of the 5th inst. (p. 674); and it will probably be interesting to him to read the opinion that Mr. F. S. Cripps, the author of "The Guide-Framing of Gasholders," expressed in respect to this guide-framing when we first introduced it, a copy of which is printed in our "Gasholder Catalogue (No. 175)" as follows:—

1.—It possesses no redundant members. This conduces to economy without sacrificing strength.
2.—It provides a very rigid and self-supporting guide-frame for the gasholder bell to work up and down in freely. No unusual strain is brought to bear upon the bell; in fact, nothing is expected of it beyond holding, storing, and delivering the gas—the transverse and distorting strains being entirely taken up and resisted by the guide-framing.
3.—Owing to the broad strut action at the base of each upright, there is but little strain on the foundation bolts. Consequently less holding-down is required, and economy is effected in building the tank.
4.—The horizontal stiffness of the guide-framing cylinder, due to the wide girder-like struts and the box-girder at top, admits of making the standards or uprights much lighter than is usually the case, without impairing the strength of the structure as a whole.
5.—The struts not only have the advantage of giving enormous stiffness and rigidity to the structure, but they, in common with the rest of the guide-framing, are very easily handled and erected—thus effecting economy both in time and cost.

We would call his special attention to the clause stating that there are no redundant parts in the "Cutler" framing; whereas it is obvious that where crossed ties are used, only a proportion of the ties can be in service simultaneously.

SAMUEL CUTLER AND SONS, LTD.

39, *Victoria Street, S.W., March* 8, 1912.

Gas and Air Adjusters for Burners.

SIR,—On p. 659 of the "JOURNAL" for the 5th inst., in the report of the lecture by Mr. Arthur Forshaw, B.Sc., appears the following:—

> "Many adjusters regulate the volume of gas by screwing a plunger towards the holes, and thus throttling the gas supply. Under these conditions, the gas loses its pressure, and merely dribbles out into the burner without the necessary velocity to draw in a good supply of air. The perfect adjuster is one which will cut off a portion of the gas without interfering with the pressure of the remainder. Another small point, but one which is likely to lead to trouble if overlooked, is that adjusters passing into the body of the injector should not have screw-threads on, as these inevitably wear slack if used a few times, and leakage is the result."

It will be interesting to learn the opinions on the above paragraph of firms selling incandescent burners with adjusters as described by Mr. Forshaw, and who claim high illuminating results from their use.

March 8, 1912. OBSERVER.

Torquay Water-Works.—The proposal to lay a new trunk main from the reservoirs at Tottiford to Torquay come before the Torquay Town Council last Tuesday. It was recommended by the Water Committee that the first section of the main from Tottiford to Hennock be laid forthwith, at an estimated cost of £5000; and that application be made to the Local Government Board for power to borrow this sum and the remainder as required; the total cost being estimated at £50,000. Alderman Smale, Chairman of the Water Committee, said the new main would produce an increased flow of 80,000 gallons of water per day. The Council decided to consider the matter in Committee.

Blyth and Cowpen Gas Company.—At the annual general meeting of this Company on Monday last week, the Directors reported that the quantity of coal carbonized during the year had been 10,738 tons, yielding 123,757,000 cubic feet of gas, or 11,525 feet per ton—being an increase of 5,525,000 cubic feet compared with the year 1910. The number of consumers, both on the ordinary and the prepayment meter systems, showed a steady increase. The hire-purchase of gas-fires was introduced during the year; and it shows signs of being appreciated by the consumers. The total receipts amounted to £20,234, and the expenditure to £13,811, leaving a balance of £6423. The amount standing to the credit of the profit and loss account was £10,190; and the Directors recommended that it should be dealt with as follows: Payment of dividend on the ordinary stock for the half year at the rate of £3 12s. 6d. less income-tax (equal to £3 8s. 3d. net), £2242; carried forward, £7848. The dividend for the six months ended June 30, 1911, being at the rate of £3 5s. 11d. net, made the dividend £6 14s. 2d. per cent. per annum (free of income-tax)—the full statutory rate payable.

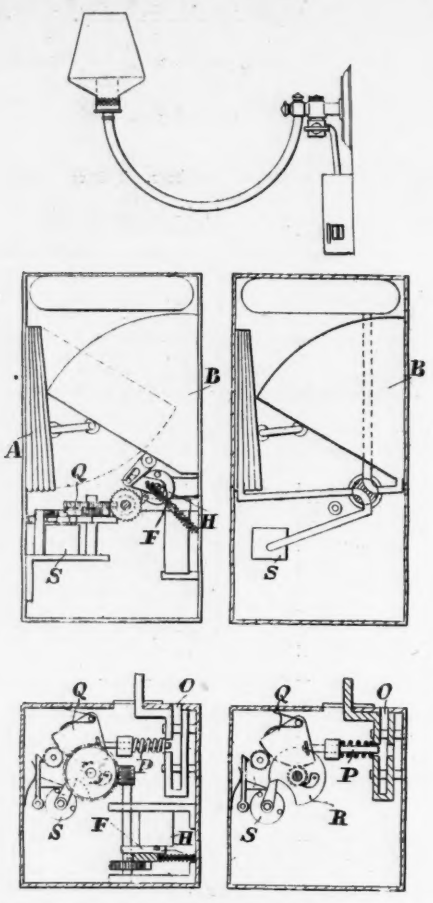
REGISTER OF PATENTS.

Gas-Meters.

KENNEDY-M'GREGOR, J. A., of Birmingham.

No. 1869; Jan. 25, 1911.

According to this invention, a prepayment meter is adapted to be fixed in a convenient position in any place, so that the occupant of the room where it is installed pays only for the gas consumed by the burner or stove appertaining to his room, and is quite independent of other gas consumers in the same house. "The device is particularly applicable for use in apartments, boarding houses, and the like, in which it is desirable that individual rooms should contribute according to their consumption of gas, but which desideratum has not been hitherto possible of achievement."



Kennedy-M'Gregor's "Lodging-House" Prepayment Gas-Meter.

The illustrations show apparatus according to the invention applied to a gas-burner, as also the arrangement of meter employed.

The meter shown is of the class having co-acting bellows, and is adapted to be freed upon the insertion of a coin. The bellows A B (in the upper portion of the meter) are of truncated triangle shape, and are so formed that the volume of gas entering the one compartment shall be at all times exactly equal to the volume leaving the other. The pivot of one bellows is at the top, and the other pivot at the bottom; the latter being at a slightly higher level than its fellow.

For operating the valve by which the gas is caused to enter and leave the bellows, the one flap is provided with an arm adapted to engage and operate another lever arm F through the medium of a transverse pin. The arm F is free to rotate on a transverse spindle; and a disc H is also arranged on the spindle in juxtaposition to the arm F. Movement of the bellows in expanding or contracting in turn slowly rotates the arm F, until a point is reached at which one compartment of the bellows has almost attained its final stage of collapse when the second lever arm is arranged to pass a dead-centre in relation to a tension spring, against the resistance of which the arm has been actuated. Upon the dead-centre being passed, the spring assists the action and brings the second arm forcibly against a pin or the pawl on the juxtaposed disc, which is thus suddenly operated and the gas-valve reversed.

The coin-freed mechanism is of the type in which the coin forms the connecting element between the actuating and actuated parts. A slot O receives the coin when in position for actuating the main gas-valve; the casing being slidably movable by means of a knob projecting from the meter for operation by the user. In the two faces of the coin-casing are apertures through which a plunger P passes when no coin is present in the casing; but in case the coin is in position, the plunger is operated and the main gas-valve is opened to allow gas to flow to the burner. A spring returns the coin-casing to its normal position.

The plunger is coupled by a link or slot to a toothed quadrant Q; while a spur-wheel, mounted on a suitable spindle, receives motion from the quadrant, but (by the thrust of the coin) the quadrant is displaced to such an extent that it is entirely relieved from the spur-wheel and is held in this constrained position by another spur-wheel controlled by a detent. Adapted to be driven in one direction only by the former spur-wheel is a disc R (having a portion cut out of its periphery) adapted to engage with the spur-wheel in such a manner that, upon thrusting the plunger against the resistance of the spring through the medium of the coin, the disc is rotated. Adjacent to the disc is the main valve S, by which the supply of gas is cut off when the equivalent volume for a given coin has been consumed. The valve (which may be of the plug type) is spring mounted; and it is furnished with a finger adapted to bear upon the periphery of the disc R. When the finger (which is secured to the valve S to move with it) is in the position shown in the plans—that is, when the finger projects into the recess—the valve is in the "off" position. But upon rotating the disc by the coin through the medium of the pawl the finger is rotated, carrying with it the valve S until the finger rests upon the uncut periphery of the disc. In this position the gas-valve is open.

Means are provided (operated automatically by the flow of gas—*i.e.*, by the gas-bellows) to gradually return the disc to the position shown in the plans. During this gradual reverse movement of the disc, the finger rests on the uncut periphery until the reces sof the disc comes into the position shown, after which the finger, being no longer supported by the uncut periphery of the disc, flies back under the influence of its spring and rotates the plug valve into the "off" position. At the same time the finger engages with the projection upon the detent, thereby releasing the latter and allowing the quadrant Q to fly back to its initial position, during which flying back it again meshes with the spur-wheel, rotating the latter, but without imparting its rotation to the disc in view of the direction in which the pawl is placed. The gas does not at once go out at the burner, as sufficient is left in the bellows (and in the anti-fluctuator attached to it) to retain the burner alight for a little time after the main valve is closed, by which warning is given that the prepaid quantity of gas is consumed.

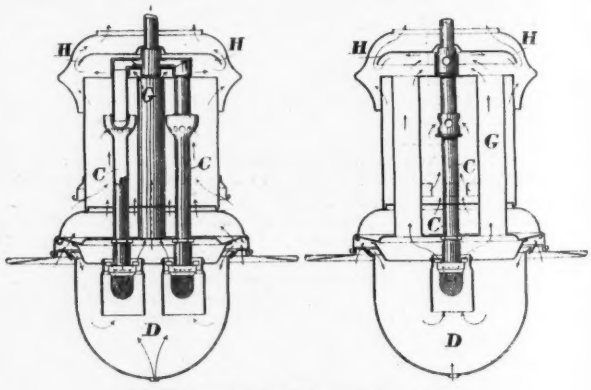
The complete device, it is said, need only occupy a space equivalent to a cube of 3-inch side; and it is preferably affixed in as close proximity to any existing gas-bracket as may be desirable.

Inverted Incandescence Gas-Lamps.

REISS, C., of Berlin.

No. 5132; March 1, 1911.

This lamp is said to secure "a high-candle power with normal or reduced gas pressure;" the gas being highly heated before it leaves the gas-nipple, and the air drawn in by the gas being preheated. The air-chamber is closed along its top; and immediately below the top apertures are arranged, so as to ensure the upper part of the mixing-tube being kept cool by the free circulation of the air.



Reiss' Inverted Incandescent Gas-Lamp.

In the cross vertical sections of the lamp, the bunsen tubes C (of greater length than usual) are enlarged or widened out at their lower ends. The air-chamber, which contains the bunsen tubes, is closed along its top, and is provided with apertures immediately below, so as to enable the upper part of the mixing-tubes to be kept cool by the circulation of air. The air, in ascending, comes into contact with the outside of the bunsen tubes, cools them, and is drawn, in a heated condition, in the tubes, where it mixes with the gas issuing from the burner-nipples.

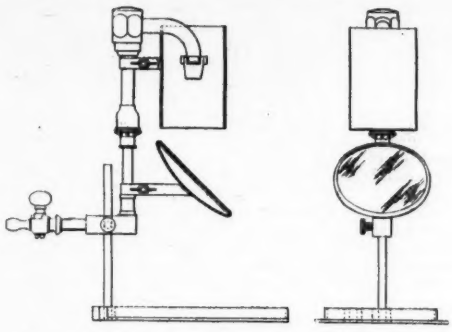
The combustion chamber D is closed at its top by two plates, arranged some distance above the flames, and also the one from the other; the purpose of these plates being to divert the products of combustion and the heat from the flames away from the bunsen tubes. The escape of the products of combustion from the chamber D is effected through channels G, which extend from the lower plate, and which allow the products of combustion to pass out above the bunsen tubes to the gas supply pipe, or to a cover-plate H, so that the combustion products directly heat the gas supply. These bunsen tubes are consequently kept cool, on the one hand, by preventing the combustion gases and the rising heat coming into contact with them, by means of the plates, and, on the other hand, by the cool air admitted. The hot mixture (consisting of highly-heated gas issuing from the nipples, and the preheated air) does not expand in the cooler bunsen tubes, but contracts; "hence any friction on the walls of the tubes is prevented." Therefore, the patentee points out, in spite of the tendency of the hot mixture of gas and air to ascend, a high velocity of the mixture is obtained in the bunsen tube; and this mixture, on escaping through the widened ends, is highly heated by the flames, so that "expansion of the mixture is possible without any considerable friction or stoppage of the flow of the mixture." Again, lighting-back of the flames, due to the high proportion of air contained in the mixture, is said to be prevented by reason of the high velocity of the downward current in the tubes.

Inverted Incandescent Gas Arrangement for Photographic Enlargement and Projection Work.

HOWELL, H., of Farringdon Avenue, E.C.

No. 6868; March 18, 1911.

Heretofore when using the light proceeding from inverted incandescent gas-burners in making photographic enlargements or in projecting lantern slides, a considerable portion of the light has, the patentee points out, been lost owing to the mantle throwing the greater part of the rays of light downwards. The object of his invention, therefore, is to enable practically the whole of the rays of light to be projected horizontally, providing, in connection with the burner, a cylindrical



Howell's Gas Arrangement for Photographers' Use.

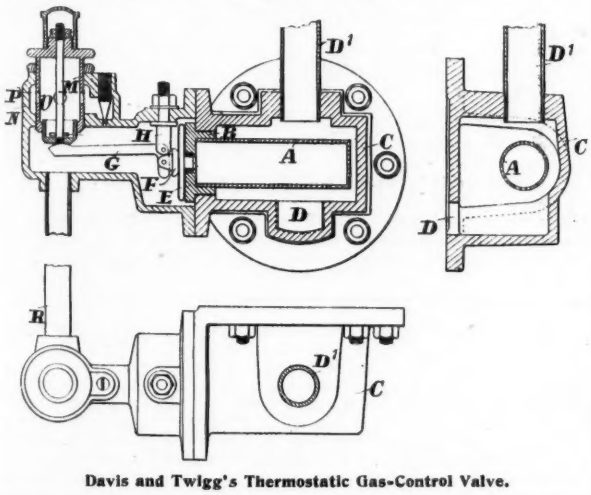
chamber open at the lower end (designed to enclose the mantle) and fitted with a removable cowl, which will allow the escape of the products of combustion but prevent the passage of any rays of light. Beneath the open end of the cylinder is fitted an adjustable mirror placed approximately at an angle of 45°, the effect of which is that the rays of light from the whole surface of the mantle are collected by the mirror and reflected in a horizontal direction.

Thermostatic Gas-Controlling Valve.

DAVIS, H. N., and TWIGG, W. R., of Luton.

No. 7210; March 22, 1911.

This valve is intended to keep the temperature of a gas-heated water circulating system constant and below 160° Fahr., "in order to prevent the deposit of the chalk which forms the temporary hardness of the water, and to prevent excessive gas consumption."



Davis and Twigg's Thermostatic Gas-Control Valve.

The container A (for oil or other suitable liquid) is enclosed in the water-chamber C. The cap B that closes the chamber is provided with an inlet pipe D and an outlet pipe D¹ connected to the circulating water system. In the cap B, and communicating with the container A, is the expansion chamber E, also full of oil or other suitable fluid. Bearing against the chamber E, so as to be affected by any movement of it, is a buffer F pivoted to the short arm of the angle lever G, fulcrummed on the stud H, and having its long arm bearing on the underside of the valve I that controls the gas supply to the burner for heating the circulating system. The valve (of the piston type) has a port L, and its lower closed end works in an opening in the end of a sleeve M screwing into the gas-chamber N, and provided with holes O opposite the annular space P in the chamber. The gas is admitted by the pipe R.

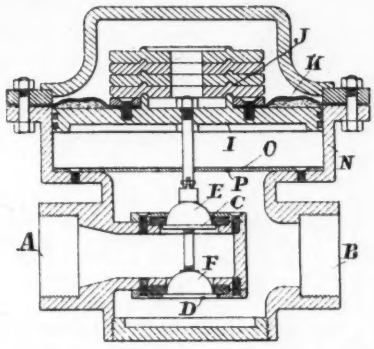
The apparatus works as follows: As the temperature of the circulating water rises, the oil in the container A and chamber E expands and operates the buffer and valve I; and at the moment when the desired temperature is reached, the supply of gas through the valve is cut off, and the water is heated only by the gas supply by the bye-pass. When the temperature again falls, the valve I opens and admits more gas until the desired temperature is again attained. The temperature at which the valve is closed is regulated by adjusting the position of the sleeve in the casting—the sleeve being screwed into the casting to lower the desired temperature.

Regulating or Controlling Gas.

BERRY, J., and GLOVER, W. T., of Oldham, and METERS LIMITED, of Manchester.

No. 7728; March 28, 1911. No. 20,878; Sept. 21, 1911.

This invention relates to a combination with an equilibrium valve, between the inlet and outlet of the gas plant and a weighted or loaded piston upon the valve-stem acted on by the pressure at the valve delivery side, of a diaphragm arranged with the piston so as to contain a supply of lubricant between itself and the piston for automatically lubricating the latter during its movements.



Berry and Glover's (Meters Limited) Gas-Controller.

As shown, an equilibrium valve is provided between the gas inlet A and the gas outlet B of the valve-casing—comprised by plate-like parts C D with guiding stalks or projections E F extending through the valve-seats. The valve-seating surfaces are formed from cork rings held in place; and the gas inlet is provided between the valves—the outer faces of the latter being under the pressure at the valve delivery side.

Upon the equilibrium valve H is mounted a piston-like element I, which has one face open to the pressure of the gas at the delivery side of the valve and its other face open to the atmosphere or under atmospheric pressure. The piston is loaded on its air side by a spring or by weights J to an extent corresponding with the maximum permissible gas pressure at the valve outlet. At the atmosphere side of the piston is a diaphragm K, between which and the piston is placed a quantity of thick lubricant, which serves to maintain the piston gas-tight within its cylinder.

Between the lower or gas side of the piston I and the gas-passage through the governor casing is a plate or disc O, having an aperture in it for the passage of the valve-stem and also further apertures (as P) which act "to restrict the rate of flow of the gas to the underside of the piston, and so prevent, in a known manner, rapid movements of the piston due to sudden variations in the gas pressure."

Lamp Lighters' Torches.

SCHWABACHER, H., of Broad Street Place, E.C.

No. 8532; April 5, 1911.

This invention relates to a lamp-lighter's torch, consisting of an attachment carrying a pyrophoric stone and a serrated metal sliding bar, operated from a spring catch at the bottom of the torch handle, and acting in such a way that, on releasing the catch, the metal bar is jerked upwards, and through contact with the pyrophoric stone produces sparks, which ignite a wick—thus producing the required flame, to be afterwards projected over the opened gas-burner. On the top of the metal bar is an extinguisher, which, on the metal bar being drawn back, is brought down over the wick and extinguishes the flame.

Gas-Heated Boiler.

FENLON, H. T., of Tudor Street, Blackfriars, E.C.

No. 21,617; Sept. 30, 1911.

This gas-heated boiler, with circulating pipes, is so arranged that "the whole of the heat from the gas-flames is imparted to the water without any loss, thereby quickly raising and maintaining the heat of the water in a perfect manner." The boiler is like that described in patents No. 493 of 1865, No. 2921 of 1871, and No. 4419 of 1875, and can be built up to any desired size to suit the amount of water to be heated, only an increased size of burner being further required to impart the necessary heat. The general arrangement was described and illustrated in an article in the "JOURNAL" for Jan. 30 last, p. 278.

Drawing Coke from Gas-Retorts.

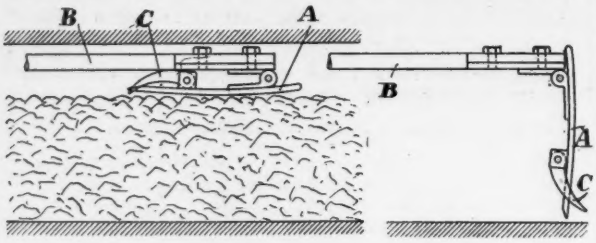
BEUTHNER, A., of Brunswick, Germany.

No. 24,928; Nov. 8, 1911. Date claimed under International Convention, July 10, 1911.

Rakes for drawing coke from gas-retorts in which a pivotally attached blade is provided on the bar which serves as a handle (and which blade when the apparatus is introduced into the retort lies parallel with the rod, but in drawing out the coke places itself in a vertical position) have the disadvantage, the patentee mentions, that the flap can only assume the vertical position when sufficient room exists at the rear end of the retort to allow the blade to be turned out of its horizontal into a

vertical position. The resulting disadvantages are said to be avoided by the rake shown.

The blade A is pivotally mounted on the front end of the rod B in such a way that, when the rake is inserted in the retort, it folds back parallel with the rod, but can assume a vertical position when the rod is drawn back. In order that, when drawing the coke, the blade may



Beuthner's Retort-Discharging Rake.

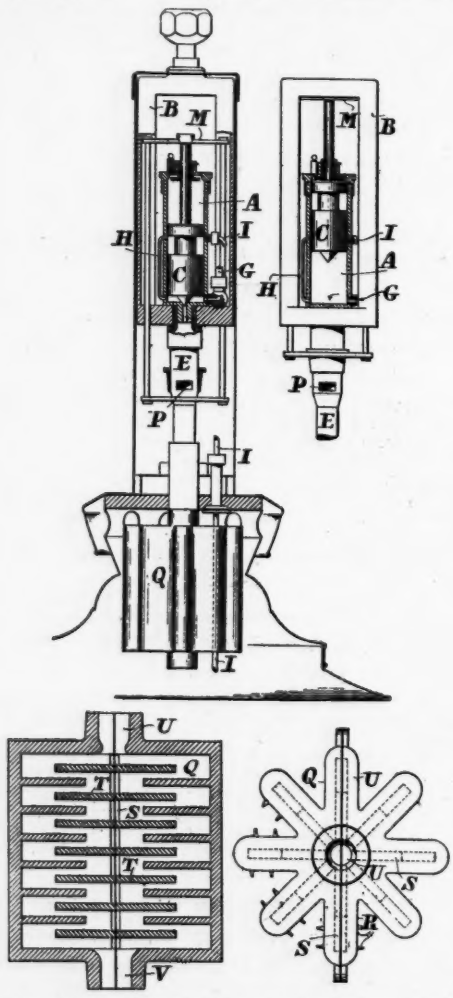
open in any position (even when the coke is piled up high) a spur C, freely movable upwards, is provided on the blade; the downward movement of the spur being limited by the blade. On inserting the rake into the retort, "the spur travels over the inequalities of the coke, yielding upwards; when, however, the rake is drawn back, the spur penetrates into the mass of coke, and thereby opens out the blade."

High-Pressure Incandescent Gas-Lamp.

CARPENTER, C., and CHANDLER, D., of the South Metropolitan Gas Company.

No. 16,706; July 20, 1911.

This lamp comprises a cylinder A supported on a fixed framing B. Within the cylinder is a double piston C having a piston rod extending through the cover of the cylinder. To the end of the cylinder is attached the bunsen tube E which carries a superheater Q (to be presently described) and the burner (not shown). The gas enters the cylinder by the pipe G, and at normal pressure passes, by the pipe H,



Carpenter and Chandler's High-Pressure Incandescent Gas-Lamp.

to the space between the portions of the piston and thence to the flash-light tube I—the outlet from the cylinder to the bunsen tube being closed by a cone on the bottom of the piston seated on the orifice leading to the bunsen. On the pressure of the gas being raised, the piston will be raised in the cylinder and the orifice opened to permit gas under pressure to pass to the burner. Meanwhile, the increased pressure temporarily elongates the flame of the flash-light; but on the piston rising to the required extent, the supply of gas to the flash-light is entirely cut off. To regulate the speed of the upward movement of the piston, a screw-controlled air escape is provided in the upper part of the cylinder, and escape of air round the piston rod is practically prevented by a ring or collar which fits slidingly on the piston rod and seats itself against the cover of the cylinder immediately the piston begins to rise. Carried on the piston rod is a cross head M, supporting a pendent frame adapted to engage with a sleeve which normally covers the air-holes P of the bunsen tube, but which is lifted by the frame when raised to the desired extent by the lifting of the piston.

The operation of the lamp when the high pressure is turned on is to admit pure gas to the burner, to ignite it by the elongation of the flash-light before any air is allowed to enter the bunsen tube (which in a high-pressure incandescent lamp is likely to cause an explosive mixture of a dangerous character), and finally to cut off the supply to the flash-light altogether. The reduction of pressure allows the gas supply to the burner to be cut off, the flash-light to be re-ignited by the still incandescent mantle, and the parts generally to resume their position of rest.

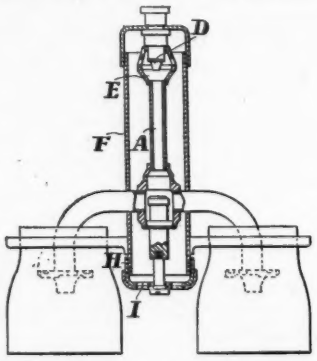
The heater employed for heating the gas mixture on its way to the burner (but which does not, by itself, form part of the present invention) is star-shaped in plan view, and the arms or points R (provided with vertical gills) contain narrow chambers S divided transversely by partitions T, which do not extend entirely across the heater but terminate a short distance from the extremity of the interior and from one another alternately as shown, so as to prolong the path of the gases through the heater. The gaseous mixture enters the heater at U and leaves it at V, where the burner is attached, "having been compelled to spread itself in thin layers within the walls of the heater which are exposed to the heated products of combustion emanating from the burner."

Inverted Incandescent Gas-Burners.

HOWELL, H., of Farringdon Avenue, E.C.

No. 2639; Feb. 1, 1911.

The usual vertical tube A and mixing-chamber E of the burner are surrounded with a casing F, having at the top a screw-threaded cover carrying the bunsen gas-nipple D. The lower end of the casing extends down to such a distance as to be clear of the products of combustion,



Howell's Inverted Two-Light Incandescent Burner.

and is there provided with holes I for admitting air into the jacket to supply the bunsen mixing-chamber at the top of the burner-tube—the holes being covered by a perforated cap or ring H for regulating the air supply.

Reduction in Price at Market Harborough.—At the meeting of the Market Harborough Urban District Council last Tuesday, the Gas Committee recommended that the price of gas to ordinary consumers be reduced 1d. per 1000 cubic feet from the 1st prox., and that the supply of gas to prepayment meter consumers be increased from 24 to 27 cubic feet for 1d., representing a reduction of 4·66d. per 1000 feet—such reduction to take effect as soon after the 1st prox. as the meters can be adjusted to the new price. Mr. Douglas said a majority of the Committee thought they might safely make the reductions, even though there was a coal strike. Mr. Goward considered it unbusinesslike to make reductions now; and he moved that the matter be adjourned for six months. This was seconded, but only the proposer and seconder voted for it. The recommendations of the Committee were then adopted. Mr. Douglas said that when the reductions came into force the price of gas would be lower than in any other town in the county, with the exception of Leicester.

Woking Water and Gas Company.—At the half-yearly general meeting of this Company on Monday last week, the Directors reported a balance of £6094 at the credit of the profit and loss account, out of which they recommended the payment of a dividend at the rate of 5½ per cent. per annum for the six months, less income-tax. This would absorb £4357, and leave £1737 to be carried forward. During the dry summer of last year, a constant and efficient supply of water was maintained. The Chairman (Mr. A. H. Baynes, J.P.), in moving the adoption of the report, said the net amount received for water-rental was £9557, or an increase of £1034 over the corresponding period of the previous year; while the receipts from building supplies had amounted to £170, as compared with £192. There were 6845 rated consumers on the rent-roll, and 664 meter supplies. The water-rental had increased from £15,236 for the year 1906 to £18,315 for 1911—an average increase of £615 per annum—in spite of the loss of revenue from the district taken over by the Guildford Borough Council, amounting to £1543 a year. The report was adopted, and the dividend recommended declared.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills read a second time and committed: Bordon and District Gas Bill, Brodsworth and District Gas Bill, Houghton-le-Spring District Gas Bill, Leatherhead Gas Bill, South Suburban Gas Bill, Swanage Gas and Water Bill, Tendring Hundred Water and Gas Bill, Wakefield Gas Bill, Wandsworth, Wimbledon, and Epsom District Gas Bill, Woking District Gas Bill, York United Gas Bill.

The Bawtry and District Gas Bill, Bawtry and Tickhill Gas and Water Bill, South Suburban Gas Bill, and Tendring Hundred Water and Gas Bill have been referred to a Select Committee, consisting of Lord Ritchie (Chairman), Viscount Gough, Lord Zouche of Haryngworth, Lord Biddulph, and Lord Charnwood; to commence sitting to-day.

The Brodsworth and District Gas Bill and Derwent Valley Water Bill have been referred to a Select Committee, consisting of Lord Newton (Chairman), the Earl of Eldon, the Earl of Lovelace, Lord Ashton, and Lord Kilmaine; to commence sitting to-morrow.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills read a second time and committed: Fleetwood Gas Bill, Windermere District Gas and Water Bill.

The Annfield Plain and District Gas Bill, Ashborne Urban District Council (Gas) Bill, Belfast Water Bill, Church Stretton Urban District Water Bill, Dunstable Gas and Water Bill, Egremont Urban District Water Bill, and Fleetwood Gas Bill have been referred to a Select Committee, consisting of Sir Harry Samuel (Chairman), Sir John Barran, Colonel Bathurst, and Mr. Doris; to commence sitting to-morrow.

LEGALITY OF FREE-WIRING AGREEMENTS.

In the "JOURNAL" for the 30th of January (p. 303), we reported the proceedings before Mr. Jeune, one of the Examiners of Standing Orders proofs of the House of Commons, in connection with the petition for the Bill of the National Electric Construction Company, by which it is sought to make valid certain agreements with local authorities relating to the free wiring of consumers' premises. A memorial complaining of non-compliance with Standing Orders had been deposited on behalf of the Swansea Gas Company and the Canterbury Gas and Water Company, whose case was in the hands of Mr. R. W. Cooper (Messrs. R. W. Cooper and Sons). In the course of the proceedings, Mr. Cooper submitted that the notices given for the Bill stated that specific agreements were to be legalized, but that no details of them had been given. As matters stood, a consumer in any town whose interest might be vitally affected could not find out what the agreements contained. In the result, the Examiner said it would not have been necessary to set out the agreements in the notices, if they had been scheduled to the Bill; but as the terms of those in one of the schedules were neither in the notices nor in the Bill, he must report non-compliance with the Standing Orders. If all the agreements had been identical with the Canterbury one, the result might have been different; but the preamble of the Bill said they varied in terms.

The petition for the Bill came before the Standing Orders Committee on Wednesday last, when Mr. A. J. Lees, the Parliamentary Agent for the promoters, asked that the Standing Orders might be dispensed with. He said the Company some years ago entered into agreements for wiring the houses of consumers who obtained their current from the local authority, and paid rental for the fittings. These agreements had since been declared *ultra vires* by three Courts of Law; and the promoters sought to make them legal. If the Bill were not allowed to proceed, the consumer would retain the fittings, paying no rental to the local authorities, and the Company would lose all their capital and the shareholders their money.

The Committee decided to dispense with the Standing Orders if the promoters would undertake to send copies of the agreements to all the parties concerned, and would not oppose the *locus standi* of their opponents to appear before the Select Committee on merits.

The following is a list of the places where these agreements exist: Bangor, Belfast, Blackpool, Bo'ness, Canterbury, Carnarvon, Coventry, Crewe, Crystal Palace District (now South Metropolitan Electric Light and Power Company), Fleetwood, Gloucester, Hackney, Hornsey, Lincoln, Pembroke, Poplar, Rathmines, Redditch, Shoreditch, Swansea, Taunton, Tunbridge Wells, Wallasey.

Petitions against the Bill have been presented by the Blackpool, Canterbury, Coventry, Gloucester, Hackney, Poplar, Taunton, and Tunbridge Wells Corporations; the Fleetwood, Pembroke, and Rathmines and Rathgar Urban District Councils; the Alliance and Dublin, Swansea, and Taunton Gas Companies; and the Canterbury Gas and Water Company.

[This, it may here be stated, is a notable victory for the gas companies, and is a direct recognition by Parliament of gas companies' interests in the matter. We may recur to the subject in next week's issue. Meanwhile, we content ourselves with congratulating the gas companies on the success of their opposition at this stage.—ED. J.G.L.]

Through the failure of the electric light the Camberwell Palace Music Hall was plunged into pitch darkness last Tuesday night; but the vocalist who was on the stage at the time continued her song without the orchestra.

LEGAL INTELLIGENCE.

WATER SUPPLY FOR WORKHOUSES.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Tuesday, March 5.

(*Before the* MASTER OF THE ROLLS *and Lords Justices* FLETCHER MOULTON *and* BUCKLEY.)

Bristol Guardians v. Bristol Water-Works Company.

This was an appeal from the judgment of Mr. Justice Eve,* who dismissed the action of the plaintiffs, who asked for a declaration that they were entitled to a supply of water to certain institutions under their control for the domestic use of the inmates and servants as to a dwelling-house, at a rental, and not by meter, as they had been hitherto supplied, and as they were still willing to take it for purposes other than domestic.

Mr. DANCKWERTS, K.C., and Mr. WETHERED (instructed by Messrs. Meredith, Miles, and Clark, agents for Messrs. Osborne, Ward, Vassall, and Co., of Bristol) appeared for the appellants; and Mr. UPJOHN, K.C., and Mr. KERLY (instructed by Messrs. Woodcock, Parker, and Ryland, agents for Messrs. Gerrish, Harris, and Co., of Bristol) represented the respondents.

Mr. DANCKWERTS said the questions here were simply whether the plaintiffs were entitled to demand a supply of water for domestic purposes to their workhouses, and, secondly, whether they were entitled to such supply at a rate based on the annual rental. The Acts which had to be considered were the Water-Works Clauses Act of 1847, the local Act of 1862, the Water-Works Clauses Act of 1863, and the local Act of 1865, which incorporated this Act. There was no dispute that the purposes for which the water was wanted were domestic; other purposes being otherwise provided for—either by rain-water reservoirs, or else by a meter supply. Mr. Justice Eve had held that only private houses were entitled to a compulsory supply, and did not shrink from the logical consequence that houses used partly as shops, hotels, and so on were not entitled to a domestic supply at all, except by agreement and at a contractual rate. In other words, there was in such cases no compulsory supply. If this were right, he submitted that the Company had no power to supply such houses or hotels for domestic purposes.

Lord Justice FLETCHER MOULTON asked if it were the result of Mr. Justice Eve's judgment that an hotel could only get water supplied to it by meter? And could a water company be compelled to supply water for trade purposes?

Mr. DANCKWERTS said that was the result of the judgment; and, in his view, it would, on the judgment, be *ultra vires* for a water company to supply an hotel at all. In certain events—for instance, in case of scarcity—it was forbidden to supply water for trade purposes. The consequences of the judgment, if upheld, would be very serious; but he did not think the Court were driven to any such conclusion. It had now been settled by the House of Lords—in Colley's case—what were domestic purposes. The Lord Chancellor said that water for drinking, water-closets, &c., even in a factory, was used for domestic purposes, and that water supplied for the purpose of a trade or business meant a supply for use in the trade, manufactory, or business. He proceeded to read the relevant sections in the Acts of 1847 and 1863, and then came to the local Acts of 1862 and 1865, in one clause of which the words "private dwelling-house" occurred, and provisions preventing the use of water supplied for domestic purposes to other purposes, and *vice versâ*. He pointed out that there were specific provisions for the supply of water for domestic purposes and for trade purposes; but there was no general provision for the supply of water, and no power to supply water for domestic purposes to any other than a private dwelling-house. The word "private" had various meanings. In Scotland, it had been held to add nothing to the word "dwelling-house;" but Mr. Justice Eve had attributed a special meaning to it. He submitted that in these Acts it only meant in particular ownership. He referred to *Cooke v. New River Company* (38 Ch. Div.) and to the Marylebone School case (1904, 2 K.B.), in which it was said that anything was a dwelling-house within the meaning of the Water-Works Acts within which water was required for domestic purposes. In the latter case, Lord Justice Buckley (then a Judge of first instance) said that where a supply for both domestic and other purposes was required in the same premises, there must be a double supply, which was what the plaintiffs here desired. He also cited the Liskeard case (7 Q B.D.) and the Chester Union case (96 and 98 L.T.).

Lord Justice FLETCHER MOULTON said the strict interpretation of the various sections quoted seemed to be that there was an obligation to supply all dwelling-houses, but only power to charge private dwelling-houses.

Mr. DANCKWERTS said that was the dilemma in which the defendants were put by the decision appealed against; but, of course, he was arguing for a more reasonable construction of the Acts. He then proceeded to deal with the defendant Company's Act of 1865, and quoted at some length from a Scotch case to show that a public-house should be included under the heading of "private dwelling-house." After referring to the Water Company's further Act of 1902, some clauses of which he submitted supported the view he was presenting, and gave the consumer the option of taking the water by meter if he preferred in certain cases, he read Mr. Justice Eve's judgment, making comments on it as he proceeded, with a view to show that the learned Judge had not properly apprehended the position.

Mr. WETHERED said the learned Judge held that the only obligation on the Company to supply was contained in section 68 of the Act of 1862; but if this were so, private dwelling-houses not situated in a public street or road, or not within 100 yards of a water-main, would

* See "JOURNAL," Vol. CXVI., p. 399.

be in the same position as a public institution, and could only obtain a supply by agreement.

Mr. UPJOHN said there were three points involved in this argument: (1) If the word private in section 68 of the Act of 1862 meant what it said, the question was this—was the workhouse a private dwelling-house within the meaning of that section? (2) If a workhouse was not a private dwelling-house, the plaintiffs had to say either that the word private in the section had no effect, and the real question was simply domestic or non-domestic use. (3) That, whatever might be the construction of the local Acts, at any rate under the Water-Works Clauses Acts there was a right on the part of every occupier of any building which could be called a dwelling-house to demand a supply for domestic purposes. He would first point out that if the second and third points were decided against the defendants it would be enormously to their advantage, as all the large business premises, such as Wills' tobacco factories, might be charged on the rateable value, and would thus be put in a similar position to the owners of business premises in the Metropolitan area, many of whom were going to the expense of sinking wells in order to avoid the enormous charges of the Metropolitan Water Board. The Bank of England, for instance, sunk a well because they would otherwise have to pay some £3000 a year for a very small quantity of water. He then called attention to the evidence in this case as to the character of the buildings involved and of the inmates, and submitted that nothing less like a private dwelling-house could hardly be conceived. The workhouse was in fact the public dwelling-house of the district. If it were held to be a private dwelling-house, he could hardly think of any class of business premises in Bristol which would not come within the definition. The term "private dwelling-house" was not confined to the Bristol Act—he had seen several other Acts in which the same phrase was used.

Wednesday, March 6.

On the resumption of the proceedings this morning,

Mr. UPJOHN pointed out the injustice and absurdity of the construction which had been suggested that, taking the provisions of the Water-Works Act of 1847 together with the Private Act, every dwelling-house in the largest sense could demand a supply, but there was no power to charge for such supply except in the case of private dwelling-houses in the narrow sense.

Lord Justice BUCKLEY pointed out that, on the other construction, there was also a difficulty almost, if not quite, as great—viz., that a non-private dwelling-house had no right to demand a supply at all, even for sanitary and domestic purposes.

Mr. UPJOHN said Parliament assumed that water companies would act reasonably, and not, contrary to the objects of their incorporation, deprive themselves of a market which was open to them.

Lord Justice FLETCHER MOULTON said Parliament did not legislate on the principle of leaving water companies to supply or not supply water for domestic purposes as they thought fit.

Mr. UPJOHN said the Company had been supplying water to Bristol since 1846, and no practical difficulty had arisen. He went on to deal with the Private Act of 1862, and repeated his former observation that it would be a great hardship on occupiers of factories and large business premises if the true construction of the Act were held to be that the small quantity of water required therein had to be paid for on the rental value. A long discussion ensued as to what meaning ought to be attributed to the phrase "private dwelling-house," the result of which was that no exact definition could be extracted from any of the decided cases. After an elaborate examination of the various sections of the Acts, Counsel concluded by submitting that the appeal ought to be dismissed with costs.

Mr. KERLY followed with an elaborate argument on the same lines.

Mr. DANCKWERTS, in reply, said the construction he asked the Court to put upon the Acts was very simple, and followed naturally from the language used, while that advocated by his learned friends introduced numerous difficulties which they had sought to elude by more or less devious ways, and, as he submitted, quite ineffectually. He referred to two decisions of the House of Lords that, in Acts of this character, the provisions as to charging, if doubtful, were to be construed most favourably to the public and against the promoters.

Judgment was reserved.

Romford Gas Company, Limited.—In the six months ended Dec. 31, this Company had an increase of about 4 per cent. in sales of gas compared with the corresponding period of 1910. As in the past half year the mains were extended by upwards of seven miles, in connection with the new "Garden City" of Gidea Park and the Balgores Estate, the next report of the Directors may be confidently expected to record a still greater increase. The total revenue for the half year was £12,680, and the expenditure £8727—leaving £3953 to be carried to the profit and loss account. The total amount available for distribution was £7230; and at the recent half-yearly general meeting dividends were declared at the rates of 13 and 10 per cent. per annum on the ordinary and "B" shares respectively. The payment of these absorbed £2595, and left £4635 to be carried forward.

Weston-super-Mare Gas Company.—A satisfactory report on the working of this Company in the six months ended Dec. 31 last was presented by the Directors at the recent half-yearly general meeting. There was an increase to the extent of rather more than 1½ million cubic feet in the make of gas; and a sum of £10,101 was available for distribution. The Directors recommended the payment of the maximum dividend for the six months, at the rate of 5 per cent. per annum (less income-tax). This they were enabled to do, notwithstanding the reduction made in the price of gas. The recommendation was unanimously adopted. In the course of their report, the Directors mentioned that the scheme for the erection of new works on recently acquired land on the east of the present works is now being proceeded with by Messrs. Corbet Woodall and Son; and that the co-partnership business is going on satisfactorily—some of the men having become stockholders. A gasholder is being erected to contain a million cubic feet of gas; and when finished it will allow much Sunday work, for which at present time-and-a-half is paid, to be dispensed with.

MISCELLANEOUS NEWS.

BARKING COUNCIL'S ELECTRICITY UNDERTAKING.

Criticism of its Financial Position by the Local Government Board.

An inquiry was held a short time ago, on behalf of the Local Government Board, into an application made to them by the Barking Urban District Council for authority to raise £11,000 for the purpose of extending their works for the supply of electricity. The Council have received the Board's reply; and its principal points are given below.

The Board are of opinion that, in view of the financial position of the undertaking, the matter should have greater consideration than appears to have been given to it by the Council. They suggest that the Council should call in an independent expert engineer to report upon the whole position of the undertaking, and particularly as to whether the extensions are required, and, if so, as to what form they should take. The Board observe that on the 19th of December (the date of the inquiry), the electric light account was overdrawn to the extent of £5040. They want to know why the Council had not complied with the provisions of the Electric Lighting Order that allow for deficits being met out of the general district rate; and they ask for some proposal as to meeting this deficit before they can consider the question of loan.

After the last meeting of the Council, the letter from the Board was considered in Committee.

The Clerk (Mr. H. Hargreaves) was instructed to reply that the question of the extensions was first considered in June, 1910, and was referred to a Special Committee for investigation and report. As a result, the Diesel type of engine for the extensions was adopted; and subsequently the Engineer's estimate for the whole of the extensions was submitted to the Council and approved. In October, 1910, tenders were invited, and on being opened those for the building were found to exceed the estimate considerably; whereupon the whole matter was fully reconsidered. At the time the Council took the opinion of an eminent firm of engineers on the extensions; and it was owing to their report proving favourable that the Council decided that the application to the Board should go forward.

As to the appointment of an electrical engineer to go into the whole question of the electric light undertaking, this had, as previously stated, already been done, of which fact it was presumed the Board were not aware. The report of the engineers dealt fully with all the points raised by the Board, and therefore the Council did not think it necessary to retain another expert. The scheme the Council submitted to the Board was the best that could be ascertained. If, however, the expert advisers to the Board could put forward a better one, the Council would be willing and pleased to give it their consideration.

As to the overdraft of £5040, £1790 of the amount was the net overdraft of the first three years' working of the undertaking. It was originally put to the suspense account, and formed the subject of a surcharge on certain members of the Council which was subsequently remitted by the Board. The Council, although quite willing to provide the particular amount, were unable to do so, as the Board had previously stated that they were unable to assist the Council by giving sanction to the inclusion of the amount in the rate for the raising of the loan.

As to the balance of the overdraft, this arose by reason of payments in respect of wages and stores in connection with the electric light account during the current financial year, and would be met by the amount outstanding in respect of current supplied up to Sept. 29, by large accounts which had been previously rendered, and by amounts due to the Council for current supplied for practically five-sixths of the December quarter, which altogether came to more than the balance of the overdraft.

It was anticipated that the installation of the Diesel engine—to use the words of the expert electrical engineer—would prove of great benefit financially, and turn the present loss into a profit, and thus enable the overdraft to be met.

PROFITS IN AID OF RATES.

The Manchester Committee's Recommendation.

Considerable discussion took place at last Wednesday's meeting of the Manchester City Council with regard to a recommendation made by the Trading Profits Special Committee, to the effect that each trading committee of the Corporation should make contributions in aid of the city rate, based upon the capital expended.

Mr. W. T. Jackson, in moving that the matter be referred back for further consideration, argued that the trading departments of a Corporation ought not to be run for profit. It was his contention that relief should be given to consumers, and the different profit-making undertakings be worked for the benefit of the public, and not for the relief of the rates, because in the latter case one section obtained relief at the expense of another. He pointed out that, by the present system of calling upon the different profit-earning departments to hand over large sums in aid of rates, the Corporation lost something like £10,000 a year in income-tax on profits. The policy of the Electricity Committee was to supply current at the cheapest possible rate, with the result that, in some of the largest works in the city, private plant was being scrapped and the municipal supply substituted. If the Gas Committee adopted a similar policy, as he hoped they would, it would contribute greatly to a purification of the atmosphere, because with gas at a low price more of it would be used for heating, cooking, and power, to the displacement of coal. He was satisfied the community would derive greater benefits from cheaper municipal services than from the supposed relief they got at present by the allocation of profits in relief of rates; and it should not be forgotten that the tendency of

Parliamentary Committees recently was to prohibit rofit-making by municipalities.

Mr. J. Foggerty, who seconded the motion, said there were evidences that public opinion was becoming more and more pronounced in favour of the charges for municipal services being as near as possible to the cost of production.

Mr. J. Hargreaves submitted that it was bad policy to rob one party in order to pay another, as was the case under the existing system; and to pay income-tax of £10,000, when it could be avoided, was, in his opinion, rather a reflection upon them as business men.

Mr. J. Johnston said he had it on high authority that the increased consumption of gas, if the price was reduced 3d. per 1000 cubic feet, would be such as would allow of its being ultimately sold at 1s. 9d. Presenting some figures to demonstrate his contention that the present system was unfair, and not what it seemed, he pointed out that the relief to the rates in the case of an occupier rated at £20 a year was 5s.; while if the present price of gas was 3d. per 1000 cubic feet less, such occupier would save in the consumption of gas 9s. a year.

Alderman Copeland (the Chairman of the Finance Committee and of the Special Committee), in reply to a question, said that further meetings would have to be held before it could be decided how much each trading committee should be recommended to contribute to the relief of the rates.

The Lord Mayor (Mr. S. W. Royse) having, at this stage, remarked that if the resolution of the Committee were adopted it might appear to commit the Council to the principle that the profit-earning departments must contribute to the rates, Alderman Copeland agreed to the recommendations of the Trading Profits Special Committee being referred back, so that a fuller report on the subject could be prepared for presentation to the Council.

GAS AND ELECTRICITY SUPPLY IN SALFORD.

The Charge to Large Consumers.

When the minutes of the Electricity Committee of the Salford Corporation were submitted for confirmation at last Wednesday's meeting of the Town Council, Mr. F. W. Wheatcroft raised objection to the ratification of agreements with two large firms in the borough in regard to the supply of electricity to them by the Corporation. He said the price to be charged was inadequate, and current could not be supplied at the figure named without loss to the Corporation, chiefly on account of the obsolescence of the plant. The price for lighting mentioned in the agreements was 250 per cent. lower than that at which the Gas Committee could supply light, and from 300 to 400 per cent. cheaper than it was being supplied at to the ordinary consumers for lighting purposes in the borough. He pointed out that but for the tramways and the consumers for lighting purposes, the electricity undertaking would be in a hopeless position. He had no objection to the Corporation selling current at a cheaper rate for power purposes; but he was of opinion that there should be only one price for that supplied for lighting purposes. It was not fair to let large firms have current at a much cheaper rate than was charged to the ordinary consumer.

Alderman F. S. Phillips, the Chairman of the Gas Committee, stated that the price mentioned in the agreements corresponded with 6d. per 1000 cubic feet of gas; and he reminded members of the Council that when the Gas Committee some time ago sought to increase the consumption by charging 1s. 6d. per 1000 cubic feet to large consumers, the Council rejected the proposal. It should not be forgotten that when the price was put up again the London and North-Western Railway Company resolved to adopt electric lighting at their Exchange Station, Manchester, with the result that the Salford Corporation Gas Department lost hundreds of pounds. In addition, the Company, in making the change, decided to get their current from the Manchester Corporation, though the station was in the borough of Salford.

After some further discussion, the Council decided to adopt the minutes of the Electricity Committee, and ratify the agreements.

HIGH-PRESSURE GAS EXTENSION AT MANCHESTER.

Advanced Policy for Private Lighting Approved by City Council.

In moving the adoption of the proceedings of the Gas Committee at last Wednesday's meeting of the Manchester City Council, Mr. W. Kay, the Chairman of the Committee, drew attention to a resolution by which the Department proposed to supply high-pressure gas to private consumers, and provide and maintain the necessary lamps, upon terms contained in a schedule of charges, subject to an agreement to be entered into by the consumer. He said that the undertaking given by his Committee not to carry out any further extension of high-pressure mains for the purposes of street lighting pending the result of the tests as to the relative merits of gas and electricity for street illumination, would be loyally observed. This arrangement, however, did not apply to the question of supplying high-pressure gas to private consumers, if it yielded an adequate return on the outlay. He was pleased to inform the Council that there was a growing demand in the city for this lighting, both for warehouses and shops; and one of the largest of the warehouse companies were negotiating for a high-pressure service. The engineer to this particular company had expressed the opinion that this method of lighting would be most economical for them; and a connection with the main had been asked for, with details as to cost, &c. The Gas Committee would follow the instructions of the Council, and not extend high-pressure lighting in the streets until the test had been made between the lamps now in use and those fixed by the Electricity Committee; but the Committee wanted to be in a position to supply private consumers when asked to do so. They desired to be allowed to pursue an advanced policy in regard to private lighting; and he hoped the Council would back them up in this.

In answer to Alderman Smethurst, Mr. Kay said the capital expenditure involved by the high-pressure lighting the Gas Committee had been asked to supply was a matter of £300 only. Asked by Alderman Wilson, who is interested in the ironmongery business, if the work required to be done in the warehouse referred to, in connection with the installation of the new system, would be carried out by the Gas Department or by the trade, Mr. Kay said it would be done by the trade.

Alderman Walker moved an amendment to the effect that the scale of charges relating to high-pressure gas-lighting should be referred back to the Committee, and that no gas should be sold to a consumer except by meter. He took this action, he said, because the schedule of charges provided for an annual sum per lamp, and because he believed that a wrong policy was being embarked upon. He alleged that makers of high-pressure gas-lamps were pestering users of electricity; and the Gas Committee now proposed to buy the lamps from the manufacturers, and instal them for consumers. He contended that it was not right for a Committee of the Corporation to lend themselves to canvassing of this sort. Referring to the schedule of charges for high-pressure gas, the speaker pointed out that they were based on a 1000-candle power lamp; and he asked if this involved the Council in any legal liability to ensure that the lamp was of this capacity.

Replying to the last question, the Town Clerk (Mr. Hudson) said the liability would be limited by the form of agreement, which had not been finally drafted.

On being put to the vote, the amendment was declared lost by a substantial majority; and the minutes were confirmed.

WAGES OF BIRMINGHAM CORPORATION EMPLOYEES.

Increases Recommended.

Important recommendations were made last Thursday by the Joint Committee appointed to consider applications for advances in wages made by employees of the Birmingham Corporation. The Committee, of which Alderman Beale is the Chairman and Mr. Antony Lees the Secretary, consisted of representatives of the principal labour-employing Committees of the Corporation; and at their meeting on the 27th ult. they received a deputation headed by Mr. Simpson, when the following demands (among others) were put forward: Boilermen in the Gas Department to have an increase of 6d. per day; all the others, except carbonizers, to have an advance of 2s. per week; lamplighters to have an increase of 2s. per week, and an additional three days' holiday per year; engine drivers, stokers, engine cleaners, and labourers in the Water Department to have an increase of 4d. per day. All regular employees of the Corporation asked for one week's holiday per annum; while short-service men demanded holidays in proportion to the time worked on full pay. Another demand was that every man should be entitled to all Bank Holidays with full pay, Christmas Day to count as a Bank Holiday; and if any man was employed on Bank Holidays, he should be paid at the rate of time-and-a-half, and be entitled to a day off on another date.

The Committee adjourned on the first occasion without arriving at any decision; but they met again on Thursday, when another deputation was received, headed by Mr. J. Stanger, and representatives of the National Municipal Employees' Association. Mr. Stanger, who explained that he represented all grades of labour, asked for a minimum wage of 28s. per week, with a minimum of 30s. for rammer-men.

The Committee sat for about three hours, and at the close of the meeting it was officially announced that the following resolution had been passed: "That, in consequence of the increased cost of living as proved by the deputations who have waited upon the Committee, the Joint Committee recommend the various labour-employing Committees of the City Council to raise the minimum rate of pay from 24s. to 26s. per week. That an increase of 2s. a week be granted to the men on whose behalf memorials have been presented from Councillor Simpson and Mr. Stanger; such increase not to apply to those whose wages are regulated by Trade Union agreements. That the foregoing recommendations do not relate to men who, by reason of age or physical defect, should be specially dealt with. That, in view of the various conditions of employment, the question of holidays be referred to the respective Committees, with the recommendation that wherever possible six days' continuous holiday, with pay, should be given, but that no further holidays should be paid for; and that where this is not practicable, eight days' holiday per annum, with pay, should be granted, three of which should be continuous—the present practice to continue as regards men required to work on public holidays." About 4000 employees will benefit by the adoption of this resolution, which it is recommended shall date from the 1st ult.

A NEW ELECTRICITY CAMPAIGN.

The outline of a new campaign for popularizing electricity was given at a meeting of the Institution of Electrical Engineers last Thursday. The paper down for discussion was "Tariffs for Electrical Energy, with Particular Reference to Domestic Tariffs," by Mr. W. W. Lackie, the Chief Electrical Engineer to the Glasgow Corporation. Following so closely upon a recent paper by Mr. A. H. Seabrook on the same subject, a comment had been made that a little too much was being had of tariffs. Presumably with the idea of meeting this criticism, Mr. S. Z. de Ferranti, the President of the Institution, stated that both of the papers were part of a scheme which the Institution is carrying out—a scheme which the Council regard as of great importance to the electrical industry generally. What they wanted to do was to use every means in their power to promote the much wider and more general adoption of electricity for domestic purposes. Some time ago, it was arranged that the Institution should not only have papers such as the two referred to, but that there should be occasional evenings upon which the members would meet and have informal discussions. It was proposed to open them by a short statement on the part of anyone willing to introduce a subject—leaving the rest of the evening open for members to talk about it. The first of these meetings will take place on the 21st inst.; and the President will introduce a subject.

In the course of the discussion, Mr. J. F. C. Snell said it was essential to devise some means for popularizing electricity, and to capture

the supply for all domestic purposes. He prophesied that the time was coming rapidly when the supply of electricity for domestic purposes would become an accomplished fact. Only a few years ago, electrical engineers were very much criticized for daring to suggest that they were going to supply power. But what was happening to-day? There were signs all round of the beginning of a considerable development in the supply of electricity for domestic purposes. Some of the companies and authorities in the Metropolis had already made a start; and in many places energy for cooking and heating was being supplied at 1d. per unit. He had been making some tests in his own house with heating; and though he had to pay 2d. per unit, there was no doubt that at this figure it was cheaper than gas. He had not reached the cooking stage yet, but was going to take it up later. Probably what was required more than any tariff to bring about this end was increasing publicity.

Another speaker was Mr. L. E. Buckell, of the Newcastle-upon-Tyne Electric Supply Company, who referred to the competition of gas. He said that figures taken out in the Newcastle district recently showed that his Company only had between 10 and 11 per cent. of the possible domestic load, and yet they were looked upon as being rather successful with private house consumers. The gas companies in his district derived a very large proportion of their revenue from domestic supply. It reached something like £300,000 a year, which was twice or three times the amount of his Company's lighting revenue. It all showed what an enormous field there was for electrical engineers to work upon.

Mr. W. A. Chamen, of the South Wales Electrical Power Distribution Company, mentioned some developments which are taking place in his area with the object of preventing gas from being supplied in certain small villages. He said his Company had taken up the subject in a number of places where there was no gas: and he thought there was a probability of making some sort of success of electric lighting. They had the idea of charging something like 1s. a week for the lighting of cottages, under certain restrictions as to use; and in order to reduce the cost of book-keeping, they had thought it might be possible to collect the money in advance, and give a receipt for it on the spot. To ensure that the lights were not used wastefully, it might be possible to connect the house services to the street lighting system, which was controlled by time switches, and in this way the house lights would be switched off during the daytime. He was not sure, however, that this would be wise, having in view the fact that it would prevent any day load.

BRESLAU GAS-WORKS.

Annual Report.

The report of the Breslau Gas-Works for the business year 1910-11 shows that the amount of gas sold was 1,550,202,883 cubic feet, which is an increase of 6·95 per cent. over the quantity sold in the preceding twelve months. Considerable extensions of the mains at the No. 4 gas-works, and a compressing and governor plant in connection with the works were brought into use during the year—the mains being first tested for soundness under compressed air at a pressure of 120 inches of water. Nearly 7 per cent. of the gas made was water gas. The coal carbonized amounted to 136,536 metric tons; and the bye-products obtained, in percentages by weight of the coal, were: Coke 74·91; tar 5·50; real ammonia 0·2666. The street lamps number 11,253; and trials which have been made so far with the Bamag and the Meteor (Rostin) distance lighting devices are regarded as having proved satisfactory—the number of failures reported averaging 0·4 per cent. of the lamps operated by the devices. The net profit for the year, after writing off interest and depreciation charges, amounted to 2,685,753 marks (£107,430).

HARROW AND STANMORE GAS COMPANY.

Increase in Consumption—Higher Dividend—Good Coal Stock.

The Half-Yearly Meeting of the Proprietors of this Company was held yesterday week, at the Holborn Restaurant—Mr. A. H. Baynes in the chair.

The Engineer and Secretary (Mr. J. L. Chapman) having read the notice convening the meeting, the report and accounts were taken as read.

The Chairman, in moving their adoption, said he thought that the accounts would be regarded as very satisfactory. The progress of the Company had been steady and continuous. The increase in the sale of gas showed that consumers were being satisfied; and the use of gas for so many purposes, especially for cooking and heating, was helping to produce an even balance between the day and night consumption, as, during the winter season, there was a very fair comparison between the day and night output of gas. The extension of building operations in the neighbourhood at the present time was such as could not but tend to the development of the Company; and the decision of the London and North-Western Railway Company to carry their traffic by the new electric line to the City and to the West-end must be beneficial in bringing new residents into the districts served by the Company. Upon the receipt side of the accounts, the gas-rental had amounted to £20,247, which was an increase of £1599 over the corresponding period of the previous year; and this notwithstanding a reduction in the price of gas of 2d. per 1000 cubic feet. The quantity of gas sold during the half year had been 123,524,000 cubic feet. This was an increase by 15,623,000 cubic feet over the corresponding period of 1910, or equal to 14·48 per cent.; and this followed on an increase of 9¼ per cent. in the same period of the previous year. During the half year, 220 new services had been laid to consumers using ordinary meters, and 360 to consumers with prepayment meters; and 285 additional cooking-stoves and gas-fires had been fixed on hire. The distributing mains had also been further extended. The meters, stoves, and fittings rentals had increased by £371. These increases were all the more satisfactory when one considered that the seasons had been extraordinarily mild—very hot weather in the early part of the half year, and mild and wet during the latter portion. The increase in the residuals totalled to £783—the prosperity of residuals being very remarkable. The average price of coke during the six months was 17s. 9d. per ton; whereas at Christmas of the previous year it stood at 15s. 9d. Tar had also fetched a higher price, and showed an advance in the average price from 1½d. per gallon to 2d.; while sulphate had brought a net receipt, after deducting all manufacturing charges, of £794, whereas at the end of 1910 it was £590. Specially good results had been obtained in the manufacture—1 ton 4 cwt. of sulphate being made per 100 tons of coal carbonized, or 27 lbs. per ton. The total receipts for the half year were £27,226, which was an increase of £2771 over the corresponding period of 1910. The expenditure showed a large increase, chiefly in connection with the maintenance of mains, meters, and stoves. This was greatly due to writing off considerable amounts for depreciation. The cost of coal had been £220 less, though 230 tons more had been carbonized. This was due to two causes—coal had been more cheaply purchased, and there had been some reduction in the cost of carriage. The additional charge for gas oil was only £31, though 3441 gallons more had been used in the manufacture of carburetted water gas. Speaking of the insurance of the workmen, he said that the Directors had decided for the future to insure their workmen with an Insurance Company, as they felt that, under present conditions, it was wiser to do so. It would be remembered that due notice was given that the Company's co-partnership scheme would be introduced; and it met with the full approval of the shareholders. Therefore, there would be £136 to be added to the £150 previously passed for this purpose. As the Directors stated some time since, it was their great desire to reduce the capital charges as far as possible; and they were pleased to say that, whereas the capital per 1000 cubic feet of gas sold stood at Christmas, 1910, at 20s. 7d., it had now been reduced to 18s. 6d. The total profit was £7780—an increase over the corresponding period of the previous year of £744. From this, debenture and loan interest took £923—leaving a balance of £6857. The Directors, considering the satisfactory position of the Company, were recommending an increase in the dividend on the "A" shares of 10s. per cent. per annum, and on the "C" shares of 7s. per cent.—making the dividend on the "A" shares 11 per cent. per annum, and on the "C" shares £7 14s. per cent. The "B" and the guaranteed shares would remain at 7 per cent., as they could not receive more. To pay dividends at these rates would take £5948; and the statutory amount for the reserve fund would require £735—making it £4040. After allocating these amounts, there would remain £174 to be added to the unappropriated profit—making it £5310. In the present condition of the coal market, the proprietors would like to know that the Directors had purchased all the coal needed up to Midsummer, 1913, at the same price as last year; two years' contracts having been made at Midsummer, 1911. The oil contract stood at last year's prices up to Christmas, 1913. The Directors felt confident the shareholders would regard the report before them as thoroughly satisfactory—indicating, as it did, further progress and prosperity, and reflecting great credit on the Engineer (Mr. Chapman) and his efficient staff of helpers.

The Deputy-Chairman (Dr. J. W. Lee Glaisher) seconded the motion, which was unanimously carried.

The dividends mentioned in the Chairman's speech having been adopted,

On the motion of the Chairman, seconded by Mr. A. F. Phillips, Dr. Glaisher was re-elected to his seat at the Board.

Moved by Mr. F. R. Smith, and seconded by Mr. W. Richards, Dr. C. E. Goddard was reappointed one of the Auditors.

Proposed by Mr. A. F. Plummer, and seconded by Mr. F. H. Pilley, the services of the Engineer and Manager and of the staff and employees generally were cordially acknowledged.

Mr. Chapman, in responding, said he thought the Company stood foremost in the matter of percentage increase in the amount of gas sold; and considering the weather that had been experienced, it was very satisfactory to feel that the efforts of the Directors to meet the wishes of the consumers had been so fully appreciated. There were difficulties, and difficulties that were not always easy to overcome, amid the best prosperities; and his staff were always putting their heads together to see, when a difficulty arose, how best it might be solved. He had never had a more loyal staff; and he felt not a little proud that he brought most of them up from boys. At the next meeting of the Company, he should himself have been in the service 40 years; he had therefore seen almost every man (except some of the older ones) grow up. As to the consumers, the Company carefully refrained from any grasping policy. They had one purpose always before them, and that was to serve the consumer. He believed the gas, as tested by the "Metropolitan" No. 2 burner, met all requirements, because they saw not only new consumers coming on, but old ones using more gas for every purpose. In regard to the present coal difficulty, the Directors had felt that it would be a just thing not to raise the price of coke to the poorer people in their district. Such policies were often wise. He did not think they wanted to grasp everything they could.

Mr. W. Richards, in moving a vote of thanks to the Chairman and Directors, remarked that the shareholders had reason to be thankful to them for a splendid balance-sheet and an increase in dividend, which would enhance the value of their holdings. They were meeting under the shadow of a great national cloud, which affected gas companies in particular; and he felt that it was an anxious time for everybody connected with the gas industry, and especially directors. The Chairman had mentioned the splendid protection they had in the matter of their coal contracts.

Mr. F. R. Smith, in seconding the motion, remarked that not one of the least of the satisfactory features of the present accounts was that the capital per million cubic feet sold had been further reduced.

The motion was unanimously carried.

The Chairman responded in the names of his colleagues and himself. He thought the proprietors would be glad to hear the Engineer's assurance that the Company had ten weeks' stock of coal on hand. Under the circumstances, this was a wise provision.

DOVER GAS COMPANY.

The report submitted at the half-yearly meeting of the Company on Monday of last week stated that, in succession to Mr. Raphael Herring, who died a few days before the previous meeting, after serving the Company faithfully and well for 24 years, the Directors had appointed his son, Mr. Edward C. Herring, as Manager and Resident Engineer at the Buckland works. Mr. E. C. Herring had been in the employ of the Company as Assistant-Manager for the past ten years. They had also granted a pension to the widow of the late Mr. R. Herring, and had appointed Mr. W. R. Herring (late of Edinburgh) as Consulting Engineer to the Company.

The Chairman (Mr. W. E. Mannering), in moving the adoption of the report and accounts, said these were of the usual satisfactory character. Though there were more consumers, there had been a decrease of 2·59 per cent. in the consumption of gas, which he thought might be attributed to the excessive heat in the summer and the warm weather in the later months of the year. The increase in the first half of the year made the output practically the same as in 1910. The balance carried to profit and loss account was £5862, against £5894. To this had to be added £213 interest on investments, making a total of £6075. After providing for fixed charges, suspense account, depreciation of sundry stores, and the usual dividend, there would be a sum of £662 to be added to the surplus profit balances of former years. He went on to refer to the official changes, and said he was pleased to bear testimony to the continued loyal and faithful services rendered to the Company by the officers and men. He asked the consumers to exercise economy in the use of gas while the coal strike lasted; and said the Corporation had consented to having half the street-lamps lit, and to these being turned on rather later and extinguished a little earlier than usual.

The report was adopted; and votes of thanks to the Chairman, Directors, Secretary, staff, and workmen were responded to by the Chairman and Mr. E. C. Fielding.

ALDERSHOT GAS COMPANY AND CO-PARTNERSHIP.

Explanation of the Scheme.

In the report of the proceedings at the recent half-yearly meeting of the Aldershot Company which appeared in the "JOURNAL" a fortnight ago, it was mentioned that the Directors had adopted a scheme of co-partnership drawn up by the General Manager (Mr. R. W. Edwards), and that it would come into force as from the 1st of July last. The scheme was explained at a meeting of all the regular members of the staff held on the 1st inst., under the presidency of Dr. F. Stroyan, the Vice-Chairman of the Company.

Addressing the employees as "future partners," the Chairman explained that the scheme to be laid before them was for the mutual benefit of the shareholders, the gas consumers, and the workmen. In future, the Company's prosperity would be wrapped up with the employees; and it would depend on the skill and assiduity they devoted to their labours, on the care they took of the materials entrusted to them, and further on the useful and willing spirit they evinced in the conduct of the affairs of the undertaking, and finally on the thrifty and moral lives they lived privately. The scheme was an experiment; and it depended on the employees for its continuance. But he was optimistic; and he felt sure they would all give the very best of their brains and their muscles in order that the undertaking might go on from success to success. In conclusion, amid considerable applause, he wished every success to the scheme.

Mr. Edwards then gave details of the scheme. Before doing so, however, he said the employees must first of all show their appreciation of the Directors for the hearty way in which they had sanctioned what he characterized as "such a humane scheme." Having explained the action of the sliding-scale in connection with the shareholders' dividends, he said the scheme provided for a bonus to every regular employee on certain conditions. Dealing first with the basis, he said the idea was to allow each worker a bonus on the amount of his wages for each year ending the 30th of June. If the scheme was introduced on the present situation, with the price of gas at 2s. 6d., there would be no bonus. Therefore, it had been decided to start the scheme by considering the price as 3s., and to allow on the difference between it and 2s. 6d. one-half per cent. per penny—in other words, 3 per cent.—to begin with. He thought they would agree with him that this was a very liberal start; but it was not all. The Board had decided to date the scheme back from July 1, 1911, which meant that the bonus would operate at the end of June this year. But the scheme would go one better. For every penny reduction below 2s. 6d., a bonus of ¾ per cent. instead of ½ per cent. would be allowed. Thus, if gas was at 2s. 3d., the bonus would be 5¼ per cent. Supposing a workman was earning £90 a year, or just under 35s. a week, a bonus of 3 per cent. would mean £2 14s. to him, but if the price of gas went down to 2s. 3d., he would get £4 14s. 6d. for the year; while at 2s.—and this price was not impossible, but a good deal depended on themselves—the bonus would be £6 15s. So they saw what they stood to get if prosperity crowned their efforts as co-partners. After referring to the introduction of co-partnership in the South Metropolitan Gas Company, and attributing to it a great deal of that Company's prosperity, Mr. Edwards said the Aldershot Company would be the first gas, water, and electric light company to adopt it; and so he wanted to see it a success.

The rules were then read by Mr. J. M. Grundy, the Chief Clerk (who had assisted in drawing up the scheme), and explained by Mr. Edwards. Several speakers (one of whom was Mr. R. Bateman, J.P., a Director) expressed the hope that success might attend the new departure.

A vote of thanks was accorded to the Chairman and Mr. Bateman; and the proceedings closed.

At Bacup, on Thursday last, five shares in the Rossendale Union Gas Company sold for £21 each.

MUNICIPAL WORKERS' WAGES.

The Position in Manchester.

Having obtained considerable concessions at Stalybridge, Salford, Stockport, and Bury in the matter of wages and conditions of employment, the Municipal Employees' Union made an effort this week to enforce an increase of the minimum wage from 25s. to 27s. a week at Manchester. A firm stand was made, however, by the City Council; and all the threats about paralyzing the municipal services in Manchester by last night ended pretty much in smoke. Mr. J. T. Jones, the Lancashire Secretary of the Union, and a member of the Manchester City Council, had declared that the men would never accept the offer of the Council of an increase of the minimum wage from 25s. to 26s.; but this has been agreed to with certain conditions, and a strike avoided—for the present, at any rate. It will be remembered that a week last Sunday the members of the Manchester branches of the Union decided upon what was practically an ultimatum to the City Council, to the effect that, unless the minimum wage for Corporation employees was raised to the 27s. level in seven days, the question of declaring a general strike of municipal workers in the city would be seriously considered. It was also asserted that, in the event of such a strike taking place, the municipal workers in Salford, Stockport, Stalybridge, Bury, and elsewhere would leave work in sympathy with their fellows in Manchester.

At the Manchester City Council meeting on Wednesday, the men's demand for an increase of the minimum wage from 25s. to 27s. per week was considered; and the discussion which took place extended to close upon three hours. It was explained by the Lord Mayor (Mr. (S. W. Royse) that the matter had been before the Conditions of Employment Committee, the members of which adopted the following resolution: "That the Council be recommended to increase the minimum wages of adult, able-bodied labourers of the Corporation who live in the city, when working a full week, from 25s. to 26s. a week, with the exception of those who, because of advancing years or deficient capacity, are retained at lower wages." In moving that this recommendation be approved, the Lord Mayor said the proposed increase of 1s. in the minimum wage would cost the Corporation £7885 a year; and a 2s. advance, as asked for, would mean £18,098 per annum. An amendment was moved by Mr. W. T. Jackson that the minimum wage be advanced to 27s. per week. In the subsequent debate, Mr. F. J. West said that, as one of the largest employers of labour in the Council, he felt he could not be silent on this subject. He was opposed to both the resolution and the amendment; for he was not prepared to vote in favour of an advance to Corporation workmen and withhold an increase from his own workmen. The Conditions of Employment Committee had not given sufficient consideration to the matter; and he protested against the action of the Union demanding an increase within seven days, and holding a pistol to the head of the Corporation. The employees were in a much better position than their fellow-workers outside; and having regard to the consideration shown the Corporation employees, they had a right to expect better treatment than the coercive measures adopted. Councillors had to consider not only the advantage of the existing 25s. minimum, but the other advantages enjoyed by workmen. Practically all the employing committees gave their workers six days' holiday every year, and half-pay during sickness—advantages which he estimated to be worth 1s. a week spread over the year. Then they were paid overtime at a rate above the average, and were not subject to the fluctuations of trade, like those in private employ. If the employing committees with unskilled labour had to carry on their work in competition with private employers, they would very soon be in a bankrupt state. The law of supply and demand fixed the rate of wages for unskilled labour very much lower than that paid by the Corporation; and the Council, in dealing with this matter, must remember that an advance of 1s., or even 2s., would not be the end of it. If an increase was granted, those men now in receipt of 26s. and 27s. a week could very reasonably demand an equal advance. Mr. J. T. Jones said the men were out to get a 2s. increase, and meant to have it. The amendment was defeated by 73 votes to 31. After further discussion on a point raised by Mr. Tom Fox, the Council refused to allow the minimum rate to apply to Corporation workers outside the city, but agreed to an amendment of the wording of the resolution so that those who work—not alone those who live—in the city should be paid a minimum wage of 26s. weekly. With this alteration, the resolution of the Conditions of Employment Committee was approved.

Very few of the men employed in the Manchester Gas Department are members of the Municipal Employees' Union. It is reckoned that fully 97 per cent. of them are members of the Gas Workers and General Labourers' Union, whose officials have been in negotiation with the Gas Committee for some time in regard to an advance in wages. As a matter of fact, this Union had already secured an advance of 1s. a week for practically all the men, in addition to concessions for certain grades. In December last, the Gas Workers' Union applied for a 10 per cent. advance in wages and time-and-a-half rates from 10 p.m. on Saturday to 6 a.m. on Monday for all men engaged in the gas-works. There was the further request that the work should be so rearranged as to obtain an eight-hour day all the year round. The Committee, after getting returns from other towns, decided last Friday to give an advance of 3d. per shift to all shiftmen and carbonizers, and to reduce their hours from 54½ to 52 per week; also to advance the wages of general labourers at the works and in the Street Mains' Department by 1s. weekly as from March 1. By the Council's resolution of Wednesday, the minimum wage of labourers in the Gas Department is, of course, raised to 26s. a week. There are a few points yet to be settled between the Committee and the Gas Workers' Union; these including the question of an eight-hour day for coke-trimmers and some claims by the clinker and tower men.

Speaking at a meeting of municipal workers at Stockport on Friday night, Mr. J. T. Jones said he expected to be in the midst of a municipal fight on Sunday; and he anticipated that by Monday night Manchester would be paralyzed. He added that he was going to ask the municipal employees of Manchester on Sunday to fight, and declared

they would never accept the resolution passed by the Council. The heads of the different departments of the Manchester Corporation issued a warning on Friday stating that all men who left work without notice would lose their places, and would not be re-employed by the Corporation. When interviewed, the Lord Mayor said they desired to rectify any grievances the men might have; but they were not going to be coerced into doing anything unjust. Mr. G. Howarth, the Chairman of the Electricity Committee, said: "I should like to point out that all the employees of the Corporation are subject to a week's notice; while under a conspiracy clause in the Act of 1875, the employees in the Gas Department can be proceeded against if they leave work without giving the proper notice." He also drew attention to the fact that the Corporation employees, while ensured of regular work all the year round, had the benefits of the thrift fund, under which the Corporation add one-third to each member's contribution, and give 4 per cent. compound interest on the total. For the year ended March, 1911, the cost to the Corporation in connection with this fund was £10,000. He did not think the men would lightly throw these advantages and privileges away by striking.

Sunday's meeting of the workers to decide whether they should strike was held at the Grand Theatre. There was a crowded attendance. It was soon evident the ultimatum of the Corporation to the effect that, in the event of a strike, steps would be taken to fill the places of the men, who would not be re-engaged, had had its effect; and there was the further fact that, at a meeting of the tramwaymen, a resolution was adopted expressing disapproval at the action of the Union, and deprecating any action on the part of tramwaymen to leave work at the present juncture. The chief speakers at the Municipal Employees' Union meeting were Mr. Davies (the General Secretary) and Mr. J. T. Jones. Very little was said about a general strike being at once declared; but much was made of the attitude adopted by the members of the Gas Workers' Union and by the tramwaymen in refusing to join with the Municipal Employees' Union to force the hand of the Corporation on the minimum wage question. The men were counselled not to leave work at present, but to wait for a more favourable opportunity to enforce their demands. In the end, the following resolution was adopted without a dissentient: "That this meeting resolves, owing to the several Committees of the Manchester City Council acknowledging by their granting of a number of concessions favourable to the employees affected, and agreeing to investigate the remainder, and also having made an increase in the minimum wage half-way, to withhold our decision until such time as we consider it right to further our demand." It was also resolved that representations be made to the Council with a view to so altering the recommendation of the Conditions of Employment Committee on the minimum wage of 26s. a week that it will apply to all workers in the Corporation employ, without restriction. One of the men's leaders said, if this was conceded, there would be an end to the present agitation.

The Minimum Wage at Salford.

The Salford Town Council, at last Wednesday's meeting, rejected a proposal by Mr. A. A. Purcell that all employees of the Corporation in receipt of less than 40s. per week should have their wages advanced by 2s. weekly, and that the minimum wage be 27s. It was only on the previous Wednesday that the Council, at a special meeting, increased the minimum from 25s. to 26s., and granted advances in pay to the different grades of gas workers, as well as employees in other Corporation departments. During the discussion, it was elicited that the advances already granted, following upon the recent strike settlement, will total about £3000 per annum, of which £1650 will be in the Gas Department, and that if Mr. Purcell's resolution was to be given effect to it would mean an increase in the rates of the borough by 5d. in the pound. The Council, by 33 votes to 8, decided that any suggestion for an alteration of the minimum wage to Corporation employees be deferred for twelve months; and, by a further resolution, it was agreed that all able-bodied adult employees should benefit by the minimum wage of 26s. per week conceded at the special meeting of the Council held the previous week. A motion to the effect that all workmen in the employ of the Corporation suspended or dismissed for misconduct by a superior should have the right of appeal to the Committee employing them, and of calling evidence if they desired it, was rejected by 15 votes to 14.

The Stockport Settlement.

There was a long debate at last week's meeting of the Stockport Town Council, with reference to the recent strike of municipal workers. At the outset, Alderman Hopkins drew attention to the following item on the minutes of the Gas Committee: "The Committee considered the question of whether the power to dismiss certain workmen should continue to be vested in assistants; and a motion that assistants shall only have power to suspend was lost by six votes to two." The Alderman moved that this matter be referred back on the ground that a great deal of the unrest at the gas-works had been caused by the action of certain foremen, in whom too much power was vested. In his opinion, the Manager should be the one to have sole power of dismissal. Alderman Fearnley, the Chairman of the Gas Committee, agreed to take the matter back.

Then followed a general discussion on the events which led up to the recent strike and the terms of settlement. Mr. J. Noden protested against the Gas Committee being blamed for the strike. It was well-known, he said, that the Gas Committee had only ten weeks, from start to finish, in which to deal with the demands of the Municipal Employees' Union—demands which affected all grades of workers in the Gas Department, except the officials and clerks. All the trouble arose because the Chairman of the Tramways Committee had refused point blank to consider the question of recognition. The Gas Committee and the Cleansing Committee had practically decided to grant the minimum wage and recognize the men's Unions. Alderman Sharples denied that he refused to recognize the Union. Dr. Murray declared that the responsibility for throwing the town in darkness, the stopping of the various works through lack of gas for light and power, and interfering with the comfort of the inhabitants, must be laid on the gas workers who struck while negotiations were pending for a settlement of their grievances. Alderman Fearnley said that there was no unrest among the gas workers until the eve of the last municipal elections; and his Committee agreed then that in the early part of the new year they would review the whole conditions of labour. This was done; and a large number of returns were obtained from other towns, so that a comparison could be made with the wages paid at Stockport and the conditions in force. The Committee had not been stingy in their decisions. In fact, they had been generous; and the representatives of the men had acknowledged their generosity, and the employees were satisfied. As to the Gas Engineer, he had made many recommendations, which, as a rule, had been carried out by the Committee. Mr. Meunier had treated many of the men in a most generous manner. Men who had not been able to continue work in the retort-house had been found employment in the yard, though many of them were not able to earn the wages paid them.

Advances to Rochdale Gas Workers.

The Rochdale Town Council discussed in private last Thursday an application which had been made by the Gas Workers' Union for an advance in wages to the labourers engaged at the gas and electricity works. Mr. Walker (the Chairman of the Gas and Electricity Committee) stated that the men's Union had been making application for an increase in wages in both departments since August last, and sent a deputation at the end of the year to urge the claims before the Committee. Stokers who asked for an advance from 5s. 3d. to 5s. 6d. per shift of eight hours had their application granted; twenty lamplighters and cleaners earning 25s. 4d. a week were raised to 26s.; main and service layers were advanced 10d. per week, making their pay 29s. and 31s. respectively; and sixteen lamplighters on part time now receive 13s. weekly. The present application was that the pay of labourers should be 6d. an hour, instead of 5¾d., for a 55½-hour week, which represented an increase from 25s. 6d. to 27s. 9d. a week. After a two hours' discussion, the Council decided to advance the pay of labourers in both departments to 26s. a week. Prior to this particulars had been supplied as to wages paid for the same class of labour in other towns. It was shown that the 5¾d. an hour in Rochdale stood against an average of 5·46d. in about forty other towns. In a number of cases holiday pay is granted in addition; a concession that was made in Rochdale a year or two ago.

Minimum Wage Conceded at Bury.

Meeting on Thursday, the Bury Town Council adopted the recommendation of the General Purposes Committee to the effect that the Corporation recognize the principle of paying a minimum wage of 25s. per week of 54 hours to all able-bodied men of full age in the employ of the Corporation, and that the heads of each department shall determine as to the fitness or otherwise of the employees therein. The local branch of the Union had asked for a minimum wage of 26s. a week, and their demands included several individual increases which, upon the recommendation of the General Purposes Committee, have been conceded in a number of cases.

The members of the Bury and District Joint Water Board had before them last Thursday a letter from Mr. J. T. Jones, Provincial Secretary to the Municipal Employees' Union, asking for the following concessions on behalf of the men: "That plumbers and meter repairers be raised to 33s. per week; caulkers and meter inspectors, to 30s.; flushers and tap inspectors, to 27s. 6d.; labourers, to 6d. an hour; and that the minimum wage of 26s. per week be established." It was resolved that the matter be referred to the Chairmen and Deputy-Chairmen of the various Committees, along with the Chairman and Deputy-Chairman of the Board, to report to a special meeting.

Men's Demands in other Towns.

At Macclesfield, the Gas Workers' Union have sent an application to the Corporation demanding a minimum wage of 25s. for all labourers in the employ of the various departments, including the gas-works. About 180 employees of the Corporation, exclusive of clerks and officials, are affected. Recently the Corporation granted a section of the labourers an increase of ½d. per hour, and the scavengers 1s. per week; but this does not reach the minimum wage now asked for.

On Friday last a deputation from the Municipal Employees' Union had an interview with the Special Wages Committee of the Southport Town Council, when the demands made by the men for an increase in wages were considered. The matter was discussed at some length; and a meeting of the Southport Branch of the Union is to be held this week, when a report of the conference will be presented.

The Gas Committee of the Denton Council have decided, in response to an application, that the wages of first-class labourers at the gas-works, who are able and willing at any time to undertake stoking, be increased to 25s. per week, and that the wages of casual labourers be advanced to 23s. weekly.

At the next meeting of the Leigh Town Council, Mr. Walkden will move—"That the minimum rate of wages for employees under the Corporation be increased from 25s. to 27s. per week."

The General Purposes Committee of the Bolton Town Council have deferred for a month the consideration of the question of increased pay for Corporation workmen and an alteration in regard to holidays.

Robberies from Prepayment Meters Last Year.—In the House of Commons on Monday last week, Mr. Joynson-Hicks asked the Home Secretary whether he could state the number of prepayment gas-meters robbed in the Metropolitan police area during the past year, and the number of prosecutions—distinguishing those of children under sixteen years of age. Mr. M'Kenna, in reply, said he had been informed that 13,261 such cases were reported to the police in the period named; that 406 arrests were made; and that 86 of the persons arrested were under the age of sixteen. The robberies took place inside houses and tenements, to which the police had no access, and in circumstances which rendered detection exceedingly difficult. Mr. Joynson-Hicks inquired if anything could be done to stop this very serious loss. Mr. M'Kenna replied that, except the abolition of the system itself, he did not see what steps could be taken.

SLOUGH WATER-WORKS PURCHASE ARBITRATION.

First Day's Proceedings.

The hearing was commenced on Wednesday, the 28th ult., and continued on subsequent days, at the Surveyors' Institution, Great George Street, Westminster, of an arbitration to determine the price to be paid by the Slough Urban District Council for the undertaking of the Slough Water-Works Company. The proceedings arose out of an Act of Parliament passed last year, to carry into effect an agreement come to between the parties. The hearing was originally fixed to commence on Thursday, Feb. 22, but on that day the Company's Solicitors applied for an adjournment, owing to the absence of Mr. Cash, Mr. Balfour Browne, and Mr. Honoratus Lloyd, who were engaged in connection with the Local Government Board inquiry at Salford.

The Arbitrators were Mr. JOHN E. WILLCOX, for the Urban District Council, and Mr. CHARLES HAWKSLEY, for the Water Company. Mr. A. J. RAM, K.C., acted as Umpire.

Mr. BALFOUR BROWNE, K.C., Mr. HONORATUS LLOYD, K.C., Mr. TYLDESLEY JONES, and Mr. W. B. CLODE (instructed by Messrs. Pontifex, Pitt, and Johnson) appeared for the Company; while Mr. WEDDERBURN, K.C., and Mr. F. N. KEEN (instructed by Messrs. Baker and Co.) represented the Council.

The Case for the Company.

Mr. BALFOUR BROWNE, in opening the case for the Company, said this was an arbitration under an Act of 1911 to determine the sum in gross to be paid by the Council for the water undertaking. Everything turned on this Purchase Act, the preamble of which set forth the history of the concern so far as was necessary for present purposes. By an Act of 1868, the Company were incorporated and authorized to construct water-works and to supply water within an area comprising the district and certain parishes in the neighbourhood thereof. Then by an Act of 1875, the 1868 Act was repealed; but it was provided that the Company should continue incorporated, and that the capital should be £20,000, in 2000 shares of £10 each, and that they might borrow on mortgage up to £5000, and might maintain the water-works and supply water within the said area. Later, by section 4 of the Water Orders Confirmation Act, 1896, the part of the Act of 1875 which authorized the Company to supply water within so much of the parish of Farnham Royal as was included within the limits of supply as defined by the Burnham and District Water Order of 1896, was repealed. Then by the Slough Water Order of 1901 the area was extended; and the Company were authorized to raise additional capital not exceeding in the whole £15,000, and to borrow on mortgage in respect thereof sums not exceeding one-fourth of the additional capital raised. By the Slough Water Order of 1906, the area was further extended. Next, under the South-West Suburban Water Act of 1908 a certain portion of the limits of supply of that Company was added to the limits of the Company for the supply of water. Under the Slough Water Act of 1910, the limits of supply were further extended, additional powers were conferred upon the Company, and the construction of certain water-works by the Company was sanctioned and confirmed. In the last-named Act, there was an agreement for purchase. As he had said, the arbitration was taking place under the Act of 1911, section 5 of which provided that: "(1) The Company shall sell to the Council and the Council shall purchase the undertaking of the Company for such price or consideration being a sum in gross, and on such terms and conditions, as may be agreed upon between the Company and the Council or as, failing such agreement, shall be determined by arbitration in accordance with the provisions of the Lands Clauses Acts with respect to the purchase and taking of lands otherwise than by agreement." This was the ordinary provision; but later on the section varied considerably from the common form: "(1) Provided that, in the event of the said price or consideration being determined by arbitration, the same shall not be any larger by reason of the issue of any capital or the borrowing of any money subsequently to May 1, 1911, without the consent of the Council than it would have been if such capital had not been issued or such money had not been borrowed. (2) Within six months after the passing of this Act, the Council shall serve upon the Company notice of their intention to purchase the undertaking of the Company. (3) In settling the amount to be awarded to the Company for such price or consideration, the arbitrators or their umpire shall award as part of such price or consideration such a sum of money as they or he shall determine to be payable in satisfaction of the perpetual debenture stock of the Company outstanding at the date of the passing of this Act; and the holders of such debenture stock shall be entitled to appear in any proceedings taken for the determination of such price as aforesaid." This was rather a unique position. It was at the time pointed out to Parliament that there were certain irredeemable debentures, and that it was necessary to give the Company power to pay them off. The other side, of course, admitted that they had to be paid; and, therefore, in order to make it quite clear, it was provided that this was to be part of the award. The section continued: "(4) In settling the amount to be awarded to the Company for such price or consideration, the arbitrators or their umpire (as the case may be) shall allow a sum at the rate of 10 per cent. as compensation for compulsory purchase and cost of re-investment. (5) In addition to the purchase price or consideration, the Council shall pay to the Company a sum of £1000 by way of compensation to the Directors of the Company for loss of office." Under the next sub-section, the Council were to repay to the Company the taxed costs of the Bill of 1910, the costs incurred by the Company in obtaining clauses and amendments for their protection in the 1911 Bill, the costs of the transfer of the undertaking and the winding-up of the Company, and the actual amount expended with the consent of the Council on capital account in pursuance of the provisions of the section of the Act dealing with the maintenance of the undertaking by the Company until the transfer.

The UMPIRE said it seemed as though the Umpire and the Arbitrators would have discharged their duty when they got to the end of the fourth sub-section of section 5, and awarded the 10 per cent. for compulsory purchase.

Mr. WEDDERBURN remarked that he agreed to this.

Mr. BALFOUR BROWNE (continuing) said section 6 set forth that the Council should purchase the stock-in-trade and stores of the Company as they stood on the day of transfer at such price as should be agreed upon; and in the next section compensation for the officers was distinctly provided for. The Company were to pay outgoings and to be entitled to receipts up to the date of transfer—"Provided that nothing in this Act contained shall entitle the Company to retain for their own benefit so much of any water rates or rents or other payments paid or payable in advance as shall be attributable to any period after the transfer; but such rates, rents, or other payments shall be apportioned, and so much thereof as is attributable to any period after the transfer shall be paid over by the Company to the Council." Section 11 read: "Until the transfer, the undertaking of the Company shall be maintained and carried on by the Company as heretofore in the ordinary course of business with all due care; but the Company shall not, without the previous consent of the Council, raise any further capital or make or enter into any contract, agreement, or obligation, except such as shall be in the ordinary course of the maintenance of the works and the proper conduct of the undertaking." All debts and liabilities were to be defrayed by the Company. He did not think there was anything else in the Act to which he need refer. The works were pumping works of a very simple description. The quality of the water was excellent; and the machinery was all of it in first-class condition. The district had rapidly increased. The population, which in 1868 was 3000, had gone up in 1891 to 8313. In 1901, the population in the area supplied was 14,000; and since then the figure had increased to certainly 19,500. The supply was about 22·6 gallons per head; and the revenue was a yearly increasing one. From 1899, the dividends had been regularly 10 per cent. There were arrears of dividends; but by the Act of 1910 it was stipulated that the Company should not pay back-dividends in respect of any period previous to Jan. 1, 1880, and that the amounts payable as such back-dividends should not exceed the sum of £8706. They were going to claim this. There were a series of agreed tables which Mr. Cash would explain. Now, how did the Company intend to deal with their claim? First of all, they said they had an absolutely safe income—secured in two ways. First, by the rapid increase of the population; and, secondly, by the quality of the water and by the quantity at disposal. At the present time, they were pumping only one-half of what they could pump. Therefore he would ask the tribunal to deal with the matter on the most liberal principles. The way the Company had dealt with the question was this: The amount of the maximum dividend on the share capital was £2768 12s.; interest on debentures, £250; total, £3018 12s. This was what they could give to the share and debenture holders; and they multiplied it by 30 years' purchase, making £90,558, to which had to be added 10 per cent., or £9055. The present value of the £8706 back-dividends (in addition to what they had in hand) was £3173. Then there was a sum of £8691 for overspent capital, &c., which made a total claim of £111,477. Of course, this left out the items subsequent to sub-section 4 of section 5.

The Company's Evidence.

Mr. *William Cash*, in answer to Mr. HONORATUS LLOYD, said that, in conjunction with Mr. Keen, he had been through the accounts and prepared a set of tables. These showed that the total amount of capital issued and paid up, including premiums, was £34,991; and the Company had still powers unexhausted. There were "A" 10 per cent. shares, "B" 7 per cent. shares, and 5 per cent. debentures—the maximum amount payable in respect of the different classes being respectively £2000, £768, and £250. There were debentures to the extent of £5000; and this was described in the Act as perpetual debenture stock. He had with him the form of certificate issued, in which it was described as "debenture stock."

The UMPIRE: Nothing turns upon it, I suppose?

Mr. WEDDERBURN: Yes; a good deal turns upon it. The whole question is, Is it perpetual or not? At the time that was put in the Act we had never seen the form.

Mr. HONORATUS LLOYD: Now, there is no time fixed by the form of debenture stock certificate for payment off?

Witness: There is nothing said about redemption there.

Examination continued: He did not at all wish to express an opinion from a legal point of view; but his own idea would be that, as a continuing company, the Company certainly would have no power to discharge this debenture stock. On Jan. 1, 1909, under the provisions of the Company's Act of 1906, the rights of charge were reduced by the substitution of a basis of net value, instead of annual rack-rent; and the effect of this was to reduce the gross receipts by a sum of about £210. But this was more than met by the normal increase in business. In fact, there had been a steady increase in the gross receipts. On the other side, the percentage of expenses was fairly constant, with the exception of parliamentary expenses in 1908. The back-dividends—limited by the 1910 Act to £8706—were entirely on account of the "A" shares, as the "B" shares had had their maximum dividend all along. Dividends had been paid free of income-tax; and the tax on the "A" shares had to be brought into account, and treated as a payment on account of back-dividends. In 1910 and 1911, £750 and £500 had been paid on account of back-dividends. The Royal Assent was, however, given to the Act of 1910 on Aug. 3; and the £750 was paid on Aug. 2. Therefore at the time this sum was paid, the Act had not been passed which restricted the payment. No doubt, the £750, being paid in respect of back-dividends generally, could be allocated to the earlier payable dividends. As a matter of fact, there was nothing in the resolution to allocate it to any particular date. There had been a constant increase in the amount of water supplied for domestic purposes; and, with the exception of 1909, when it dropped a little, a constant increase for trade and meter supply. The adjusted revenue account for 1911 showed that the water-rental had again gone up; and though the expenses had risen somewhat, the profit had increased from £4631 to £4921. The percentage of expenses was practically the same—34·52 on the gross water-rental, against 34·24 in 1910. There was a considerable amount in 1911 for law charges. The profits shown

for 1911 were sufficient to meet the charges for interest and also the maximum dividends, and leave a surplus of £1673. The capital was overspent by £8690; and as the Company were prevented by Parliament from raising capital to pay this off, they asked that the Council should pay the actual amount without premium. The Company were also in a position to say there was a surplus income adequate to pay interest on this sum. In point of fact, this was what was done in the Worksop case. After paying out this sum; the bank loan, &c., there would be £4549 in cash available to pay back-dividends; and for this sum he suggested that the Company should give credit in their claim for back-dividends.

Cross-examined by Mr. WEDDERBURN: As to the 10 per cent. shareholders, there were only seven. The amount spent for repairs and renewals of the works was small; and the profits were subject to any revision that might be thought necessary on this head. Witness was then taken in detail through the figures in his tables.

Mr. *E. Brough Taylor*, examined by Mr. TYLDESLEY JONES, said he was first consulted by the Company in 1900, and was thoroughly acquainted with the undertaking and the district supplied. The Company's limits included the urban district of Slough, and the parishes of Datchet, Langley, Stoke Poges, Wexham, Burnham Poyle, and parts of Horton, Fulmer, and Farnham Royal. The population figures showed a rapid increase; and though the Company were supplying a large proportion of the population in Slough, there was a very big part of the population in the other districts not yet supplied; and from them revenue was to be anticipated in the future. The district was one in which he could expect developments in respect of building. The total quantity of water pumped last year was about 148 million gallons, which gave a consumption of 20·4 gallons per head per diem for all purposes. The metered supply in the same period was 19 million gallons, or 2·6 gallons per day per head of the population supplied. This left a domestic supply of 17·8 gallons per head. A much greater quantity of water could be obtained from the four Datchet wells, if required. With the present plant, the Company had a surplus capacity of 40 per cent. over the highest day's consumption last year. There were three pumping-engines at Datchet, in excellent repair, each of which could more than maintain the maximum supply. The service reservoir, of a capacity of 1¼ million gallons, was quite enough for the requirements; and the distributing system was also sufficient for the district. The pressure they were giving was considerably in excess of any statutory obligation. From the portions of the area which were too high to be satisfactorily supplied from the service reservoir, there was a tank holding 37,000 gallons, fed by a pumping-station from the reservoir. This afforded a good pressure over the northern part of the district. Coming to his valuation, he thought the accounts for 1911 were exceptionally favourable; and he did not consider it would be fair to take them as the basis of valuation of the undertaking. He had therefore made various adjustments, which gave him a net revenue for the year of £4735, as against the balance which appeared in the agreed figures of £4921. His adjustments left him with a revenue which was absolutely secured, and which ought to increase as the district developed. Dividend and interest charges (including bank interest) came to £3248; and this left him with a balance of £1487 available for the payment of back-dividends. The maximum dividends and debenture interest (£3018 12s.) he capitalized at 30 years' purchase. He regarded a water company as quite an exceptional class of investment—one of the best secured investments, in fact, that one could possibly hold. A water company had a monopoly of its business by Statute; its rates were provided by Statute; and it was secured against strikes of its own employees by Statute. Therefore, a water-works investment must be a very well-secured one. But as regarded the present Company, as he had endeavoured to show, the works were adequate for maintaining the supply, they were able to pay the full statutory dividends and were paying off back-dividends, and they still had a large reserve of profit each year. The 30 years' purchase of £3018 12s. gave £90,558, to which he added 10 per cent. Then there was the item "Present value of back-dividends, £3173." The agreed tables showed that the amount of allowed back-dividends outstanding at June 30, 1911, was £7208, subject to the question of the £750 to which Mr. Cash had referred. The Company claimed that they were not bound to deduct this £750 from the sum allowed, which made the amount due at the date named £7958. Deducting £58 for income-tax on the half-year's dividend paid in 1911 to the "A" shareholders, left £7900. As against this, there was £4549, the figure in the agreed table, as the balance which the Company would have in hand after receiving the over-spent capital, debts outstanding, and other assets which they were to liquidate, and after payment of the bank debt and dividends for 1911. This left £3351, which would be paid off by 1914, giving the present value of £3173, on the 3½ per cent. table. The over-spent capital was £8691, which brought his total value to £111,477. This was what he thought the Company were entitled to.

Cross-examined by Mr. WEDDERBURN, witness said there were very few companies whose revenue was as well secured as that of the Slough undertaking. A number of companies were named, the average yield of which was from 4 to 5 per cent.; but witness said he had not considered them. Neither could he say whether, supposing a shareholder were to get the figure he suggested in this case, it would work out at £33 per £10 share. His purpose was to value the undertaking, and that quite irrespective of whether it benefited the shareholders of the Company or whether it did not. He did not see any elements of risk. He could not conceive that this water could be other than of the very highest quality. The pressure was enough to reach the cistern in any house in the district; and therefore, so far as domestic supply was concerned, it was sufficient. As they could reach the top storey, he maintained they had fulfilled their obligations as regarded fire supply. He did not know anything of a recent fire at Stoke Poges, where, Counsel suggested, owing to inadequate pressure, it was impossible to work the steam fire-engine to the full.

Second Day.

Mr. *Taylor*, recalled and further cross-examined by Mr. WEDDERBURN, said it had been held that there was no obligation upon water authorities to give for fire purposes any special quantity of water. The present storage reservoir was all that was necessary; and it was in a suitable place, having regard to the levels. If it became necessary to enlarge it, they had land for the purpose. It would not be better to have a reservoir at the higher altitude at Stoke Common. The life of the tubular boiler he had put at forty years. The pumping plant was limited by two considerations. One was the water they could pump from the existing well; and the other was the amount that could be discharged through the two mains. The old works were abandoned in 1885 because so little water was obtained in the well sunk there. He had never heard that the water was anything but satisfactory.

Re-examined by Mr. BALFOUR BROWNE: The Company's present charges were fixed by an Act of 1906 to come into operation in 1909; and the following year, when they were in Parliament, there was not one word of complaint about the charges. There was not a water company that had not some 3-inch mains; they were generally employed for ordinary distribution.

The UMPIRE: If for any reason the tribunal should be of opinion that the scheme is shown to be something less than perfect in any particular way, you would agree, would you not, that, treating it as a scheme with a certain amount of imperfection, there ought to be some multiplier lower than 30 years?

Witness: I should rather treat any imperfection in the scheme as a deduction from the valuation on the 30 years' purchase.

In other words, supposing that the tribunal were of opinion that *x* pounds would have to be spent shortly, you would take it from the total sum which you multiply by 30?—Yes; I should retain the multiplier, but make a reduction for any such works. I should like to point out that if the works are only necessary shortly, I do not think any deduction should be made, because I am not taking into account any enlarging of the income earned by the Company. It is merely the permanent income; and if the works to-day maintain that, there is no reason why they should not next year. It is the additional supplies that will be brought in which will necessitate additional works; but I have not taken into account the value of the additional supplies.

Dr. *J. C. Thresh*, examined by Mr. TYLDESLEY JONES, said he had visited the works and taken samples of the water. The superficial gravel was continuous under Datchet; and it contained a large quantity of water. This water was undoubtedly flowing from the Datchet side towards the river. It might be possible to reverse this flow by pumping; but it was in the highest degree improbable, because of the enormous amount of water there was in the superficial gravel. The wells were sheathed with steel and pierced the chalk; and, from their position and the strata they were going through, it was practically impossible for any superficial water to get down. Thus the water which came from the boreholes must be derived from the chalk. He had examined samples of water from the river there, and also samples from the boreholes; and he was surprised to find how different the waters were. The water from the boreholes was characteristic of that from the deep chalk in what they called the London Basin. The hardness was about the same as that of the Thames water; and it was perfectly satisfactory so far as all requirements for a public supply were concerned. The organic matter present was very small indeed, compared with that in the River Thames. In the bacteriological aspect, the results were exceedingly satisfactory. In the engine-house, of course, a certain number of bacteria got in from slip-water, and the dust and dirt in the house itself. This was no fair indication as to the actual condition of the water in the boreholes. He had known of water coming from works at the top of a well containing a large number of bacteria; and when they actually got down to the borehole and took water out it was sterile. The packing of a pump was sometimes full of bacteria. The *bacillus coli* was absent from the three samples of the Company's water he had taken. Water of this character would undoubtedly be deteriorated either by storage or by filtration.

In cross-examination by Mr. WEDDERBURN, witness said that if there was any river water at all in either the well or the boreholes, it had undergone such a change that it was quite immaterial whether it was there or not. He did not think there was any indication in his analyses that the nearer one got to the river, the more the Company's water resembled river water.

Mr. *John H. Secker*, in answer to Mr. HONORATUS LLOYD, stated that he had been Engineer and Manager of the Slough Water-Works since 1904; and he had assisted his father for many years before that. There had been no complaints from any local authority since 1904; but some questions had been raised with regard to the supply for fires. About 1888, the Council started converting the old 1¾-inch fire-plugs by means of an adaptor on which they fixed 2½-inch hydrants. Therefore the area of the outlet from the main remained as before. They had an exceptionally large fire-engine for the size of the place. Since then, some hydrants had been fixed which had the full aperture. If they had sufficient hydrants properly fitted, there would be no difficulty whatever.

Cross-examined by Mr. WEDDERBURN: There was no failure in the pressure, and there was no failure in quantity. The pressure was sufficient for all the statutory obligations of the Company. They could carry the water to the top storey of every house. The pressure would have been greater if the service reservoir had been put at Stoke Common; but the friction in the pipes would also have been greater, owing to the increased distance. Other objections were capital outlay in construction, and greater cost of pumping. It would have cost more; and it was unnecessary.

Re-examined: In 1910, in consequence of the increase of population, his view was that the time would very soon come when they would have to increase their mains if there was to be a largely increased public supply; but having since made tests, he was satisfied that there was an ample supply.

Mr. *Edward M. Eaton*, in reply to Mr. HONORATUS LLOYD, stated that he had made himself familiar with the conditions of the Company and the supply. It was a capital concern, with plenty of water, and ample appliances to distribute it; and it was altogether a very high-class undertaking. In the matter of pressure, they could amply fulfil their statutory obligations. There was every reason to believe that the Company could, by means of their existing works, send water, if necessary, to the cistern in the topmost storey of every house in the

district. He had studied the geology of the district for between forty and fifty years; and to his mind there was no conceivable danger of Thames water getting into the supply. The tubes were in a hermetically sealed water-tight formation. The analyses of the water of the wells strikingly corroborated his views, as they were essentially different from Thames water. There was no doubt as to the sufficiency of the supply; any reasonable quantity of water could be obtained from the land in the possession of the Company. It was merely a question of putting down boreholes or a well. There was no necessity for softening the water; and he had never heard its hardness complained of. If the hydrants were properly provided with 2½-inch apertures, and there were enough of them, he knew of nothing to prevent an ample supply being given in case of fire. He had gone through Mr. Brough Taylor's valuation, and agreed with it. There was not the slightest doubt that the revenue was worth 30 years' purchase. Of course, it was only right that the over-spent capital should be paid.

Mr. WEDDERBURN: It may save time if I say that I am not going to raise any question about over-spent capital, other than with regard to the value of the land.

In cross-examination by Mr. WEDDERBURN, witness said the number of years' purchase he had asked for different companies varied, as the circumstances were not the same. It was possible to invest in water securities to yield 4¼ and 4½ per cent.; but he did not admit that they were necessarily as well secured as the ordinary stock of the Slough Company.

Third Day.

Mr. *Cash*, re-called, said the total amount of income-tax paid on the maximum dividends, &c., was £563. Part of this the Company contended that they could, if it had not been paid to "B" shareholders, have paid to "A" shareholders as an additional sum for back-dividends—this portion amounting to £423. The remaining £140 was paid after the back-dividends had been limited. If this £140 was deducted now, it would all come out of the pockets of the "A" shareholders, whereas the "B" shareholders had benefited by it. Instead of the amount of back-dividends to be provided being put at £7900, there should be a further surplus of (say) £800 between December, 1911, and the date of transfer; so that the sum might be reduced to £7100. The adjustments would make the amount available each year £1600, instead of £1487; and this, of course, would lessen the period within which the sum was estimated to be earned—it would have been paid off before December, 1914, and therefore it would not be discounted for such a long period. These alterations must be on the assumption that the Company obtained from the Council the sum they claimed for over-spent capital.

Mr. *Eaton*, re-called, and further cross-examined by Mr. WEDDERBURN, said that by sticking to water companies he got his 4¼ per cent.—not easily, but he managed to scrape it up somehow. He had no risky companies. In the Devonport case, he first of all capitalized the undertaking at 40 years, and then deducted sums necessary to place the works in proper order. The Company could not maintain the supply; and therefore their income was not amply secured. Really, in the present case the 40 years was reduced to 30 because of the change in the value of money. He had not allowed anything for making good any deficiency in the works, because the Company were handing over a large balance of revenue, and also because, in his view, there was nothing to make good. In Worksop last year, when the value of money was the same, he had put 33⅓ years. In that case, there was a superior style about the buildings and things of that kind. Though there was this difference in the multiplier, he could not agree that all the Umpire would have to do was to see how many years were awarded in the Worksop arbitration, and then give the Slough Company 3⅓ years less. He did not, on the whole, think the Council were badly advised to get a fire-engine of the size they had. From the consumers' point of view, the pressure was all that could be desired; but from the point of view of what the captain of the fire-brigade might desire, possibly it was not all that might be wished. He did not admit that in a first-class undertaking the water was as a rule laid on at a pressure which would reach the top storey of the houses by means of the hose. There were many places in the flat parts of England where no such thing, he believed, was possible. Both the well and the borehole waters were quite different from the river water. It was, in his opinion, absolutely impossible that increase of pumping might suck the water from the river underneath the clay. There were cases in which it had occurred; but they were not analogous to this. The charges were reasonable when compared with neighbouring towns.

Mr. WEDDERBURN: Mr. Eaton said, in regard to the replacing of the old plugs by a hydrant, that the aperture had been reduced from 2½ inches to 1¾ inches. We have gone into it; and our case is that it has been reduced from 2⅜ to 2 5/16 inches, and not 1¾ inches at all.

In re-examination by Mr. HONORATUS LLOYD, witness said he recollected Mr. Diggle maintained that Devonport was a very bad undertaking; and having done so, he said it was worth 28·57 years' purchase. Whatever sum was awarded in the Worksop case included an amount for debentures, for unexpended capital, and for back-dividends. Supposing that the award in this instance amounted to £100,000, the shareholders could not conveniently go to the Stock Exchange and invest it in water securities. Until he came into the room, he had never heard a suggestion made against this water, or any risk of contamination referred to by anybody. The thick beds of clay afforded absolute security against contamination. As to the hardness of the water, he could find no trace of any complaint being made. The two pieces of land purchased were admirable ones for the undertaking—one for the extension of the reservoir, and the other for the protection of the boreholes.

The UMPIRE: You took a certain multiplier in Worksop. Why did you take a higher one in that case than you have to-day?

Witness: The circumstances of Worksop, to my mind, justified the higher multiplier. The works were structurally and, if I may say so, architecturally superior to these. As regards the stability of the works for water-works purposes, there is no appreciable difference between the two cases; but from just the outside view and the appearance of them, I think Worksop carries a slightly higher value than these do, and I gave effect to it in that way. That was the entire reason why I adopted 30 years in this case, as against 33⅓ years in the other.

Mr. *Taylor*, re-called, said, in answer to Mr. BALFOUR BROWNE, that he had been asked how the prices at Slough compared with the charges made by other companies. He had looked into the matter since, and found they were below the average of recent legislation.

Mr. BALFOUR BROWNE intimated that, subject to the calling of one other witness, who had been sent for in consequence of something his learned friend had stated, but who had not yet arrived, this would be the case for the Company.

GAS APPLIANCES FOR TRADE AND INDUSTRIAL USES.

In connection with an exhibition of gas apparatus suitable for trade and industrial purposes held by the Reading Gas Company at the gas-works from Monday to Friday last week, Mr. J. Fentiman, of Messrs. Fletcher, Russell, and Co., Limited, gave practical demonstrations in the afternoon and evening of the first two days. The appliances on view were suitable for brazing and enamelling, fusing metals, case-hardening and tempering, melting metals for working jewellers, coffee roasting, heating irons, &c. Another interesting demonstration, which afforded convincing proof of the excellence of gas lighting from a hygienic point of view, was the fixing of a fan above a gas-lit globe. The fan sped round rapidly—showing how air is induced to circulate by the gas from a burner. This demonstration, which was the idea of Mr. D. H. Helps, the Engineer of the Company, received a good deal of attention. The lighting of the exhibition was carried out by Messrs. W. Sugg and Co., Limited, and was greatly admired.

Mr. Fentiman explained that his Company had sent a small selection of apparatus to show some of the uses to which coal gas could be applied for various trade and industrial purposes. Of late years, there had been considerable development in the use of gas in the way mentioned; and Mr. Helps and his Company were so convinced that there was good scope for this work in Reading, that they were starting a department to develop it. Mr. Fentiman mentioned a few points in regard to the law under which these and all other furnaces worked: Where a temperature of not higher than 1800° or 1900° Fahr., or a bright red is required, the ordinary low-pressure burner in a suitable furnace is sufficient. These burners are also adapted to apparatus for carbonizing or case-hardening, for muffle furnaces, and for melting metal which has a low fusing-point, such as stereotype metal. For temperatures above those mentioned, the high-pressure gas-burner, working at from 2 lbs. to 11 lbs. is suitable. The simplest method for working at temperatures higher than 1800° or 1900° Fahr., however, is to use air under pressure with the ordinary gas supply.

On Tuesday afternoon, a very interesting display was given by the British Oxygen Company, with their specially constructed coal gas and oxygen cutter. A steel joist about 16 in. by 7 in., having a web of from ¼ in. to 1⅛ in. thick, was repeatedly cut into sections throughout its width in the course of a few minutes—an operation which would have taken about twelve hours to perform with apparatus. This cutter is extensively used in engineering workshops; and builders often employ it for the removal of steel joists and other ironwork from buildings where drills cannot be conveniently employed. These demonstrations caused a large amount of comment in Reading.

Ilford Gas Company.

At the ordinary half-yearly general meeting of this Company on Monday last week, the Directors reported that the steady growth in the Company's business had continued throughout the latter half of the past year; the sale of gas showing an increase of 5·41 per cent. compared with the corresponding period of 1910. There was a balance of £16,585 available for distribution; and the Directors recommended the payment of the statutory dividends for the six months at the rate of 7½ per cent. per annum on the "A" and "C" stocks, and 6 per cent. per annum on the "B" stock (less income-tax). These payments would amount to £6886, and leave £9699 to be carried forward. The Chairman (Mr. W. Ashmole), in moving the adoption of the report, said the past half year had proved to be the most successful the Company had had. The quantity of gas sold had been 197,771,000 cubic feet, compared with 187,611,000 cubic feet—showing an increase of 10,160,000 cubic feet, or equal to 5·41 per cent. Notwithstanding this considerable increase, it was gratifying to note that the expenditure on manufacture and distribution compared very favourably with the latter half of 1910, as the result of alterations in the retort-house. The money received from the sale of gas was £700 more, in spite of the reduction of 1d. per 1000 cubic feet in the price. The total income from coke, tar, and sulphate of ammonia was £6567, against £6598. There was a loss on coke; but the revenue from tar and sulphate of ammonia nearly compensated for this. The plant had been kept in thorough repair out of revenue, and was in first-class order. Since the beginning of this year, new plant had been added capable of making 750,000 cubic feet of gas per day. It was now at work, and it had proved to be capable of doing all that was claimed for it by the makers. The report was adopted. The dividends recommended having been declared, votes of thanks were accorded to the Chairman, Directors, officers, staff, and workmen. The votes were acknowledged by the Chairman, the Engineer and Manager (Mr. W. B. Farquhar), and the Secretary (Mr. Gerald H. S. Irons).

Bishop's Stortford and District Gas Supply.—At the recent meeting of the Bishop's Stortford, Harlow, and Epping Gas and Electricity Company, the accounts presented for the half year ended the 31st of December showed a balance of £3555 on the revenue account, and a sum of £4908 available for distribution. The Directors recommended the declaration of dividends at the rate of £5 14s. and £5 10s. per cent. per annum on the ordinary stocks, and of £5 and £4 per cent. per annum on the preference stocks. The payment of these would absorb £2943, and leave £1965 to be carried forward.

COAL STRIKE AND GAS SUPPLY.

The Position in London—The Price of Coke.

The "Westminster Gazette" last Friday contained a special article dealing with the position of the gas supply of London in view of the present crisis in the coal trade. The writer had obtained reports from gas companies in and around London; and they are given below. He said it would be conceded that the managers had made all possible provision against the general withdrawal of coal supplies; and it was further demonstrated, in connection with the companies' charges for coke, that a desire to extract the last penny out of the exigencies of the hour did not dominate the minds of all engaged in the trade.

GASLIGHT AND COKE COMPANY.

This Company a couple of years ago brought the enormous district of West Ham within its sphere of influence, and during 1910 used 1,793,756 tons of coal in supplying 690,015 consumers. Without committing themselves to any definite statement as to the amount of coal within their reach, the Directors of this Company were [on Thursday] credited with having made provision for the maximum strain that is likely to be put upon their resources. "We have enough coal," said the Company's representative, "to last any conceivable period covered by the strike." It was subsequently elicited that the stocks of coal available might reasonably be expected to keep a full supply of gas at the service of the public for at least seven weeks.

SOUTH METROPOLITAN GAS COMPANY.

Heavy emergency coal purchases have placed this Company in a position to assure its customers—of whom during 1910 there were 352,453—that an undiminished supply of gas will be at their service "until the early part of May." This Company, in 1910, consumed 1,100,642 tons of coal. Two months' supplies, therefore, on this showing, cannot be much less than 183,440 tons, and might probably be more. "We are sending out a special notice to all our customers," said one of the Company's chief officials; "and, in addition to assuring them that they will be able to have as much gas as they want for the next two months at least, we are also reminding them that, in spite of the high price at which the coal has been bought, our charge to them for coke will remain unchanged. The decision to keep coke at the old price has caused a good deal of surprise in various quarters; but the Directors are pursuing this policy entirely out of regard for the poor people around them, upon whom the inflated coal prices have fallen with crushing severity. The demand for coke has surpassed anything ever recorded in the history of the industry; and we have at last been compelled to restrict the sale to our own gas customers and coke consumers already on our books. For the convenience of the poorer purchasers, who have neither money nor storage-room to enable them to buy coke in large quantities, we are selling it in brown-paper bags at 4d. for 28 lbs., which is only 3d. per cwt. more than is charged for separate lots weighing 6 cwt. apiece."

TOTTENHAM AND EDMONTON GAS COMPANY.

An interesting statement was made by Mr. A. E. Broadberry, the Engineer and Manager of the Tottenham and Edmonton Gas Company, who supply 60,000 consumers, including 18,158 ordinary and 41,503 slot meter users.

"This is essentialy a slot district," Mr. Broadberry said. "But we are very proud of the growth of the business all the same; and it is with the utmost pleasure that we are relieving the anxiety of our clients by informing them that we are not likely to be beaten by this deplorable strike. Like the Gaslight and Coke Company, we make a considerable proportion of water gas, which requires no coal for its manufacture. Even so, however, we consume 105,000 tons of coal per annum; and just now our requirements demand 300 tons per day. We manufacture in the proportion of 70 per cent. of coal gas to 30 per cent. of carburetted water gas; and last year, in place of an estimated 5 per cent. increase in the total consumption, a 12 per cent. increase was recorded.

"With regard to the coal supply, I have been trying my hardest since last October to secure full deliveries; but the contractors in that period, despite all my hustling, have fallen behind their contracts by 10,000 tons. We always keep a big reserve of coal; but on this occasion we wanted to get the last ounce. We have enough coal in stock to last eight weeks; and if the strike lasts longer than is generally believed to be possible, we could modify the proportions of the two gases by making more carburetted water gas, and thus prolong the supply to the public by at least another month. I should be loth to resort to this expedient, however, for that would involve a big call upon the coke supply, to the serious detriment of the public, from whom the demand for coke is increasing every hour. Our relief at the substantial character of the coal reserve may be guessed when it is remembered that we are not likely to secure fresh deliveries of coal within three weeks of the conclusion of the strike."

Necessity for Economizing Fuel.

On all hands, emphasis is being laid on the necessity for exercising economy in the use of fuel. The Government have been making inquiries of the gas companies in different parts of the country as to the quantity of coal they have in hand; and instructions have been issued that, wherever possible, gas is to be used in place of steam. It may be mentioned here that, according to reports which have reached us, there are stocks of coal in hand sufficient to last for periods ranging from three weeks to more than four months; Bromley, Slough, and Ventnor being in specially favourable positions.

In a letter in "The Times" on Monday last week, Sir John Wolfe Barry urged that in the present crisis systematic economy in the use of fuel is of primary importance. He suggested that it is not perhaps sufficiently recognized by many that such economy in our dwelling-houses is not merely a matter of restricting the size or number of domestic fires, but that the efforts of all should be earnestly directed to the immediate conservation of all that energy employed for the service of our households which has its origin in the consumption of coal. For example, all wasteful employment of gas, electric light, and water should be at once discontinued in every dwelling, whether it be large or small. He said he was convinced that, without hardship, much economy in the employment of coal could be rendered possible in every household, independently of that general reduction in the burning of fuel in fire-grates which he supposed all had more or less taken in hand.

The "Pall Mall Gazette," in an article which appeared last Friday, indicated various ways in which economy of coal could be achieved; the easiest being to allow it to be converted into gas or electricity before it was applied to domestic uses. The writer drew special attention to the fact that there are no fewer than 1,300,000 heating and cooking appliances for gas and electricity in London alone supplied from the mains of the great companies.

With the view of economizing coal, considerable attention is being given to coke; and there is consequently increased demand for it. This, as a rule, is being liberally met by those who have stocks of the fuel to dispose of. The decision of the South Metropolitan Gas Company not to raise the price of coke either for domestic or trade purposes has been mentioned already; and the South Suburban Gas Company have not increased the price to their ordinary consumers. A philanthropic gentleman in Croydon has arranged with the Gas Company to supply coke to the poor at a cheap rate; and at Leeds it is being sold in pennyworths in paper bags.

Curtailment of the Public Lighting.

In order to economize coal, the public lighting has been suspended or curtailed in a number of towns. Among them are the following: At Batley, the lamps are extinguished at 1 a.m. instead of 5 a.m.; and only every alternate lamp is lighted. At Bolton, there is no public lighting except in a few main roads. The Town Council have appealed to the public to economize; and a suggestion has been made that householders should put lights in their windows to guide wayfarers. At Cambridge, only half the lamps are being lighted, and this is done later than usual. Except at the corners of the principal streets, the lights are extinguished at or soon after midnight. At Canterbury and Dover, the lighting has been curtailed; and at Castle Donnington and Shardlow it has been suspended. At Exmouth, it has been curtailed by 1½ hours daily; and at Malvern, reduced as far as practicable. About 1000 of the public lamps have been out at Oldham since last Wednesday night; and this will be continued so long as the necessity exists. In many parts of the town the lamps contain two burners; and in these cases only one is lighted. In streets which have two lamps close together, one is extinguished. The lighting of the large lamps in front of the Town Hall is also being curtailed. At Sheffield, the lamps are lighted one hour later and extinguished one hour earlier than usual. At Stalybridge, it has been decided to light only one burner in lamps containing two or three burners, and to light alternate lamps in approved positions in certain streets or roads. The Saffron Walden Gas Company have been compelled to keep the streets in darkness; and they issued a notice last week calling upon householders to exercise strict economy in the use of gas. At Teignmouth, the public lighting has been reduced by one-half.

FATALITIES IN GAS-WORKS.

Mr. H. R. Oswald, the Coroner for South-East London, held an inquiry last Wednesday, at the Co-operative Institute, Woolwich, into the circumstances attending the death of John Guy (36), an unskilled labourer, which occurred at the Beckton station of the Gaslight and Coke Company. Mr. C. Beasley Robinson (Messrs. Monier-Williams, Robinson, and Milroy) appeared for the Company; and Mr. J. N. Reeson, Engineer-in-Charge at Beckton, was in attendance. Henry George Ockwell, a rope-runner, said that on Saturday morning, the 2nd inst., he was on a light engine going to retort-house No. 6. When he got to the end of the house, he was about to give the signal to the driver, when he turned round and saw the body of the deceased in the 4-feet way. He had no business where he was, as there was on the doors a notice that no workmen, excepting those employed in the house, were allowed in the coke-hole. George Lambert, an engine-driver, said he did not observe anything when he took the engine into the retort-house, until the last witness called his attention to the deceased lying on the metals. While driving, he felt a slight jar; but he thought it was due to some defect in the road. In answer to Mr. Robinson, witness said he was not going at more than a mile-and-a-half an hour. John Phillips, a labourer, stated that he saw deceased on the evening of the 1st inst. going towards the works, and he said he was going to have a sleep because he felt ill. Dr. John Guest said he was called to No. 6 retort-house on the morning of the 2nd inst., and saw deceased. There was compound fracture of both legs, and a very large wound on one of them. He was much puzzled to find only a very small quantity of blood. After giving the matter very careful consideration, he came to the conclusion that the deceased had been struck on the back of the neck, and had died through shock. In answer to Mr. Robinson, witness said the only doubt he had was as to whether deceased might have been dead before the engine struck him. He thought, however, the cause of death was crushing of the spine and the forcing of the ribs against the lung, followed by shock. The Coroner having summed up, the Jury returned a verdict of "Accidental Death," and exonerated the driver of the engine from blame.

Mr. R. Henslowe Wellington held an inquest at Lambeth last Wednesday on the body of Eli Humphries (43), a stage foreman, employed at the Vauxhall station of the South Metropolitan Gas Company. It appeared that the deceased was crushed between the framework of a press and an elevator in the retort-house; and death ensued immediately. Caution against passing this spot was put up years ago, in consequence of the men using the narrow passage. The injuries sustained were a fractured skull and shock; and the Jury found that the deceased accidentally met his death through his own negligence. Mr. Washington, on behalf of the Company, said they deeply regretted the loss of an old and valued servant; and, notwithstanding the verdict of the Jury, they would look after his dependants.

WATER SUPPLY IN BRISTOL LAST YEAR.

Effects of the Drought.

In moving, at the recent annual meeting, the adoption of the report of the Directors of the Bristol Water Company for the year ended Dec. 31, some figures from which were given in the "JOURNAL" last week (p. 689), the Chairman (Mr. H. N. Abbot) said the result of the year's working was practically indicated by the increase in the revenue, which was a very satisfactory—in fact, almost a record—increase of £5000. It was the more satisfactory seeing that they had had five very lean years following five fat ones. The £5000 was due to the drought. He could not say the revenue had gone up permanently by this sum, as the drought was to a very great extent responsible for the large revenue received. It was a curious year. They had two months very wet, then came seven months of downright drought, followed by three months in which they replenished their stocks, having plenty of rain again. From the 1st of March to the 1st of October, they were 8½ inches behind the proper rainfall; and the drought for the time was tremendous. So heavy was the consumption, that on some days 14 million gallons of water per day were supplied to the public. While a drought might tend to bring fresh domestic customers on their books, it had a very direct effect on trade. For businesses, they must have water; and the result had been that the increase in revenue was attributable to £800 for domestic use and £4400 for commercial purposes; so that they would see what a large proportion of the £5000 was attributable to trade requirements. The increased consumption of water in the Company's district had been 250 million gallons; their daily average having gone up from 9·6 to 10·2 million gallons. The normal annual supply was 3500 millions, and last year it had gone up to 3750 millions—a total increase of 250 millions. In going through the accounts, it would be noticed that the working expenses had gone up. This, of course, was a natural consequence of the drought. The increased delivery meant increased wages, increased coal, and increased pumping. Looking to the future, he did not think the prospects for the coming year were very good. The loss of water-rates owing to the number of voids was heavy, and it seemed to him that the builder who wanted to build houses was making a mistake. Above this there was the shock of the last census. When the the Registrar-General was making up his census, he thought they had 382,000 inhabitants in the Bristol area; but on the 1st of April it turned out that there were only 357,000. Instead of going up, as he supposed, 43,500 in ten years, including those introduced by the extension of the boundaries, they had only gone up 18,000; so that 25,500 people were missing in Bristol. During the five years before the census, there must have been considerable migration from within the boundaries of the city, but not enough to account for the 25,500 people who were not drinking the Company's water. Considering how they went through the long drought, he thought they might congratulate themselves on a very creditable performance; and for this they certainly had to thank their staff, their Engineer (Mr. J. A. M'Pherson, M.Inst.C.E.), and he might include the Directors.

NEW WATER SUPPLY FOR LUDLOW.

Last Thursday an important event in connection with the Corporation of Ludlow took place on the occasion of the completion of the new water supply. Ludlow has been fortunate in being able to obtain for generations a good supply of water; and the present source, obtained through the kindness of the Right Hon. the Earl of Plymouth, is stated to be inexhaustible. The proceedings commenced with a luncheon given by Mr. E. T. Evans, the Mayor, who presided—among those invited being the Earl.

At the close of the luncheon, the inaugural ceremony was performed in Castle Square by the Earl of Plymouth, who drank some of the water from a goblet, suitably inscribed, presented to him by the Mayoress. He thanked the Mayor and Mayoress for their extreme kindness to him, and said he would preserve the goblet as a memento of the honour they had done him. He heartily congratulated the ancient borough of Ludlow upon completing the new water supply, which was one of the very best, and equal to their requirements.

The Mayor, in an interesting speech, traced the history of the water supply of Ludlow from the time of Sir Henry Sidney, in 1559, to the present day. In the early part of 1910, he said, the condition of the water supply caused grave anxiety to the Council. In April of that year, the Borough Surveyor (Mr. J. Alfred Spreckley) submitted a report setting forth the various proposals which had been made in connection with the water supply since 1877. The Town Council decided to obtain expert advice. This was not the first occasion the borough had had reason to congratulate itself upon securing the able services of Mr. H. P. Maybury (the Kent County Surveyor). The plans were designed by the Borough Surveyor, to whom great praise was due. The Contractor (Mr. Richard Davies) had given every satisfaction; and last, but not least, he must mention the Chairman of the Sanitary Committee (Alderman Sheldon). He proposed that their best thanks be tendered to the Earl of Plymouth and to the officials connected with the undertaking. Alderman Sheldon seconded the proposition. Cheers were given for the Earl of Plymouth and the Mayor and Mayoress, and the proceedings closed.

Winchester Water and Gas Company.—In the report presented at the recent half-yearly general meeting of this Company, the Directors stated that the receipts from the sale of water and gas continued to show a satisfactory increase. The balance of the net revenue account available for distribution was £7761; and the Directors recommended the payment of dividends on the preference and consolidated ordinary stocks for the half year at the rate of 4 per cent. per annum, less income-tax. This was agreed to. The Engineer and General Manager (Mr. H. C. Head, Assoc.M.Inst.C.E.) certified that the whole of the plant had been maintained in a thorough and efficient condition.

WATER SUPPLY IN FLANDERS.

An Important Scheme.

The following particulars of a scheme of water supply for Flanders appeared recently in the Engineering Supplement to "The Times."

Lower Belgium is a region very ill-supplied with water. The surface water mostly used is of poor quality, and often liable to contamination. Hence the people have to rely on rain water. In order to remedy this situation, a number of local authorities have of late years taken steps to ensure adequate supplies of drinking water, and have with this object entered into an agreement with the Compagnie Intercommunale des Eaux, which supplies Brussels with water collected in the valley of the Bocq, a tributary of the Meuse, between Namur and Dinant. A scheme for which the Company have recently been authorized to make the necessary acquisitions of property contemplates the collection of water from the Houyoux River, a tributary of the Meuse, between Liége and Huy, and involves the building of a conduit thence to Mazy in the Namur province, where it will join the present aqueduct supplying Brussels with water from the Bocq.

The collecting works have been in progress for three years in the neighbourhood of Modave. The conduit leading to Mazy will be about 30 miles in length, and will have a width of 3 ft. 8 in., with a depth of 5 ft. 11 in., calculated to give an average daily supply of about 19 million gallons. It will be necessary to construct a principal reservoir of 5½ million gallons capacity near Brussels, whence a conduit 79 miles long will lead to Ostend through Assche, Alost, Ghent, and Bruges. This will constitute the main trunk line of the new scheme; but a branch 19 miles long from Assche will probably be constructed for the supply of Termonde and Saint-Nicolas, and another 7 miles long will convey the Houyoux waters from Ostend to Blanckenberghe.

The Company are at present in possession of all the necessary land between Modave and Mazy, and have acquired a strip of land, 33 feet wide, between Brussels and Assche. From the latter place the conduit will follow the provincial and governmental roads, except at Ghent, where several buildings remain still to be acquired.

The whole scheme is estimated to take about four years to complete, and will cost 26 million francs, to be covered by a loan, to which Ghent, Bruges, Ostend, and Blanckenberghe have undertaken to contribute. These are the four principal towns interested in the scheme; and the water will be supplied to them at 10 c. per cubic metre, or 4½d. per 1000 gallons. For the other communes served, the supply is to be made directly by the Company at a fixed rate, which it is expected will be the same as in Brussels, or 22s. a year. The completion of the scheme will be of peculiar interest for Ostend, where the existing water supply is obtained chiefly from wells. According to the contract, the Company have to furnish a maximum of about 1⅓ million gallons daily; but the town has to guarantee a yearly consumption of about 308¼ million gallons.

After the completion of these works, the mains of the Compagnie Intercommunale will represent a total of 185 miles, crossing Belgium from one end to another, and calculated to provide a daily supply of 19 million gallons.

SOME QUESTIONS OF THE HOUR.

Mr. Yates's Views.

Presiding last Thursday at the meeting of Messrs. John Wright and Eagle Range, Limited, Mr. H. JAMES YATES expressed regret that Mr. Sanders had resigned the chairmanship of the Company, in consequence of having gone to live a long distance from Birmingham. He was, however, retaining his seat on the Board. In view of Mr. Yates's extended experience as Managing-Director of the Company, the Directors had elected him Chairman. The report showed that they had a balance to deal with of £66,260; and it was proposed that £8000 of this sum should be carried to the reserve fund, which would bring the fund up to £73,000. This transfer, along with the amount of the dividends, would leave a sum of £10,657 to be carried forward. Cash in hand and in the bank amounted to £61,187—which was a very strong position.

Mr. YATES made a lengthy speech, in which he brought out some interesting points. The main portions are reproduced below.

COMPETITION AND PROFITS.

All who are associated with the management of large manufacturing concerns to-day, must realize the great difficulties which have to be faced. The conditions of competition were never so keen. Business in many directions can only be retained at considerably reduced prices, in addition to which even greater value than before is expected in the manufactures. This means that, in order to maintain our position, the turnover each year has had to be greatly increased, though, unfortunately, owing to present competitive conditions, this increase in turnover does not show anything like a proportionate increase in actual profit. It may occasion you some surprise when I tell you that a large portion of our turnover which used to be a profitable source of income has now ceased to yield any profit whatever. It is, however, necessary to continue this part of the business for the sake of maintaining our position and prestige in connection with the more remunerative sections of the business. All this emphasizes the importance of a continual increase in the turnover, so as to enable us to secure such satisfactory results as those now before you. With this in view, every effort has been put forth during the past year, with the gratifying result that for 1911 our turnover has greatly exceeded that of any previous year. The results which we are able to show you to-day also constitute a record. Increased turnover naturally necessitates increased facilities for production and distribution in the way of extended buildings and additional plant and machinery and increased staff. During the past year, we have further extended the works; these extensions having involved an outlay of many thousands of pounds. We now have in hand still further additions, which will be the largest yet undertaken. Then, apart from this, we continue to carry on the policy by which the works

during the past few years have been entirely remodelled and equipped with the latest machinery; and entirely new methods of working also adopted, such as have not previously been associated with the manufacture of gas-stoves, and which alone have rendered it possible to retain our premier position in the industry. We have the largest gas-stove works in the world; and during the past year we acquired additional land for extensions.

In one sense, there is apt to be a certain disadvantage attaching to the fact that we are able to carry on the business with a capital which is small when compared with the extent of the Company's operations. It is liable to be forgotten that the actual capital in the business by means of which the profits are earned is much larger than the capital on which dividend is paid. In past years (as is proposed also for the year to which this balance-sheet refers) the policy of the Company has been to retain part of its profits in the form of reserves. The reserve fund, supplemented by the contingent reserve, is actually additional paid-up capital employed in earning the annual profits. That we should be able to continue year after year to pay a dividend of 20 per cent. is only rendered possible by the fact of our being in a position to work with this disproportionately small capital. If our paid-up capital had been increased proportionately to the size of our business, so as to represent more accurately the relation of profit earned to capital actually employed, shareholders would receive a much lower dividend.

Wages and Dividends.

An important matter which is probably not fully known or realized, is the amount of wages earned by the workpeople as compared with the amount earned by the shareholders as dividend on the capital invested. It will be of interest to you to know that we actually pay in wages several times the amount which we distribute in dividends. In the unexampled gravity of the situation created by the unhappy dispute in the coal industry, I feel I have every reason for emphasizing this matter. The difficulties inseparable from the present unrest which prevails among the workpeople throughout the country, are difficulties from which no large manufacturing business can hope to be wholly exempt, and which must be a source of deep concern to all who are in close touch with present conditions, and who look ahead into the future. I, for one, sympathetically realize the obligations of the community and the employers towards labour, and particularly towards such as may not be receiving what is known as a living wage. I know the frequent disadvantages and even dangers which have often prevented the worker from getting into sufficiently close touch with the employer, and so making any representation at first hand; and I appreciate the good that has resulted from the labours of many trade union officials appointed to fight the battles of the worker. What cannot be too strongly deprecated is such action by unions or officials as tends to stir up needless strife between employer and employed, and renders the peaceful adjustment of questions increasingly difficult.

Unfortunate Trades Union Methods.

It is an utter misfortune for all concerned that agreements made between masters and men should have become (as they often are to-day) scarcely worth the paper on which they are written, or that an arbitral decision is frequently a dead-letter unless it be in favour of the men. What ought to engage the strenuous endeavours of all earnest men, both employers and workers, is the bringing about of healthier relations between the workers and the employers—a wise recognition by each of the other's difficulties and rights; a removal of the causes on both sides of that suspicion on the part of workpeople which unhappily paralyzes progressive methods, and often actually keeps down the earnings of the workers. I know of instances to-day where workpeople who are paid at piecework rates could earn wages altogether in excess of the amount they actually receive. The union, however, limits their output, and goes even so far as to prevent additional hands being employed, in the mistaken fear lest this should result in loss of employment to those who are already engaged in the work. Senseless and irresponsible restrictions of this kind mean irreparable damage to an industry, and to all whose interests are bound up with it.

Decay of Apprenticeship.

It is greatly to be regretted, in the interests of industrial progress, that the system of apprenticeship is in many trades now practically a dead-letter. Many workmen resent youths being brought in to learn their trade, fearing that they will themselves be superseded so soon as the youth has completed his apprenticeship; and this feeling has found expression in restrictions by many unions which have brought apprenticeship to its present effete state. The result of this is seen in the number of youths wandering about the streets to-day, having been taught no trade, and soon degenerating into hooligans. I am convinced that the present methods in relation to the training of future workers are entirely wrong, and that no improvement will be effected until better counsels prevail. The demand for competent men is more than ever in excess of the supply—a fact which is, I believe, entirely due to lack of training in the early days—and until there is recognition on all hands of the duty of systematically training and thoroughly equipping the future workers in our industrial concerns, there remains a heavy handicap upon increase in our national efficiency as a commercial community. The one thing which alone can be relied on to ensure the success of any business to-day is the application of science both to production and to the business generally. In our own particular line of business, scientific investigation and research work, as carried out in our chemical and physical laboratories, play an important part; and but for this, your Company would not be occupying so high a position in the trade as it enjoys to-day. We must not associate the word "Science" with laboratories only. There is the scientific training of the workmen, most of whom have hitherto been brought up on a rule-of-thumb method. Most youths show at a certain stage natural aptitude for certain work; and the training given should be such as will best fit a youth for the proper carrying out of that particular work. A man trained on these lines will realize the responsibilities resting upon him, and recognize that he is not a mere pawn in a game, but an intelligent, and, indeed, essential, factor in the success of the organization of which he forms a part. One is continually hearing of

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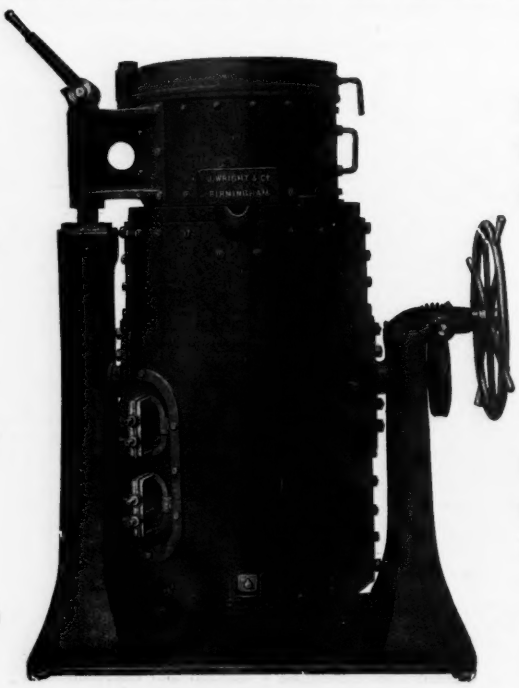
Prices and Full Particulars upon Request to the Makers:—



For use with High-Pressure Gas.

Expert advice and assistance in the selection of suitable furnaces willingly afforded.

We make furnaces for all trade purposes—for use with high or low pressure gas, or with air blast.

JOHN WRIGHT & CO., Essex Works, BIRMINGHAM.

agitation for shorter hours of labour by workpeople; whereas the staff of clerks—not to speak of the employers themselves—are finding their hours of work considerably on the increase, and are frequently found to be working longer hours than the workpeople themselves, who have no responsibilities other than the immediate work in which they are concerned.

Gas-Fire Investigations.

Another of the causes which has contributed to our success during the past few years is the number and value of our investigations in connection with gas-fires. In fact, I may say we have in this connection had the good fortune to set the standard to the industry; and it is gratifying to find that all makes of gas-fires to-day are modelled as closely as possible on the lines we ourselves have laid down. Gas-fires, not many years ago, were not regarded as a real substitute for a coal-fire, but as a stop-gap for occasional purposes, and if constantly used would not be either economical or comfortable. Whatever truth there may have been as regards gas-fires of the old school, the gas-fires we make to-day can be used to replace coal-fires entirely for all-day use, with all the economy and other advantages of the coal-fire and none of its drawbacks, and with other important advantages of economy and convenience peculiarly their own. Up to within the last few years, gas-fires were so constructed as to give off the greater part of their heat by high-temperature convection, which necessarily overheated the surrounding air and caused great discomfort. The gas-fires we make to-day give the greater part of their heat by radiation; convected heat being reduced to the necessary minimum, and given off at a low temperature, so that, while it is warming the air, it produces none of the discomfort caused by the older gas-fires, and still to be found in association with overheated hot-water pipes. One the greatest faults with the old type of gas-fire was that a proportion of the products of combustion was frequently allowed to escape into the room; and, indeed, there are many fires made and sold to-day which still suffer from this same defect. Every fire made by this Company is absolutely free from any such drawback. We are careful to see that no new apparatus is ever allowed to reach the public until it has passed the high standards which we have set up—a policy which is well rewarded by the esteem with which our manufactures are regarded, and the consequent increasing demand we are experiencing for them. Gas companies all over the kingdom are now supplying gas-fires on hire-terms to their consumers; a number of important undertakings actually supplying and fixing these appliances free, for the sake of the increased consumption secured thereby. As the result of the excellent work we have done in the perfecting of these apparatus, we are more than sharing the results of this well-considered enterprise on the part of gas undertakings throughout the kingdom. In this connection, a most valuable testimony to the unique position we occupy as setting the standard in gas-fires, not only in this country, but on the Continent, has just appeared in the German and English Technical Press. Mr. E. Körting, of Berlin, the well-known authority in gas science, has published the results of comparative tests he has made between the best German type of gas-stove and the best English type. The one English stove he chose for the test was one of this Company's make, expressly recommended to him by a leading gas engineer, and chosen without any communication with us; and Mr. Körting expresses himself as astonished at the great superiority of our type of gas-fire over the best type Germany has yet evolved. The comparative figures he gives as to economy and efficiency fully warrant the high encomium he expresses. [See *ante*, p. 671.]

Heating Water by Gas.

There is another direction in which there are possibilities of enormous development, and that is the economical heating of water by gas. We have enjoyed our full share of this business up to the present, but have realized that there is yet much to be done. And, with this in view, we have during the past three years carried out a large amount of research work in connection with gas-heated hot-water appliances. We have overcome the exceptional difficulties which had to be faced; and shortly we shall be placing upon the market a gas-heated apparatus for the supply of hot water for domestic purposes which will be within the reach of practically every householder, and for which we anticipate very considerable sales.

Gas for Commercial Purposes.

We are also developing our business in the important application of gas for commercial uses, in the way of gas-furnaces and such-like appliances, for which there is an increasingly great demand, as manufacturers are beginning to realize the advantages of using gas as an absolutely reliable and economical fuel. The reduced rates which are also prevailing in many directions for gas for industrial purposes have also resulted in further stimulating the demand for these gas appliances, in which connection we are steadily building up an increasingly large and satisfactory business.

In the "Financial News," some two months ago, reference was made to a company about to be formed, with a capital of £2,500,000, to take over and work in 41 countries the "Permutit" and "Luminator" processes for the sterilization and softening of water. Our contemporary is informed that this company will not now be formed; the processes having been secured by Mr. George A. Kessler and a group of capitalists, who have formed a private company, the whole of the capital for which has been subscribed.

A fire was discovered in the electrical power station of the Old Lodge Tinplate Works, Llanelly, last Wednesday night. It appears that the plant was being worked for the purpose of providing light for the finishing department, which, owing to the coal strike, was the only portion of the works in operation. A plentiful supply of water being available, the outbreak was got under control in about half-an-hour. The electrical plant and shed were, however, destroyed; and the estimated damage is £1500. It is believed that the fire was caused by the fusing of wires.

The Coming

of the

CALEFACTOR!

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The coal strike so far has not materially interfered with the gas supplies to the public throughout Scotland, although in some districts a curtailment has been made in the matter of street and other lighting. During the week any important accession to the coal stocks at the different gas-works on a large scale has been well-nigh impossible, on account of the curtailment of the train services. On Tuesday, the Perth Town Council made a purchase of 200 tons at 22s. 6d. per ton, against a normal price of 10s. per ton; the Dundee dealers only allowing fifteen minutes in which to complete the bargain, as the Aberdeen Corporation were also after the same lot.

Speaking at the meeting of the Scottish Automobile Club in Glasgow on Tuesday evening, Lord Provost Stevenson denied that there was any ground whatever for a statement that had been made to the effect that in a very few days the city would be in darkness. The subject was again referred to at the meeting of the Corporation on Thursday, when, in answer to Mr. M'Clure, Bailie Paxton, the Convener of the Gas Committee, said the Gas Department "could hold out for a very considerable time."

In Aberdeen, the lighting of the town has been slightly curtailed, especially on the outskirts, with a view to conserving the city's gas supply. A warning has been issued to consumers to be careful in the matter of lighting and heating. At the gas-works, the supply of coal is estimated to last for at least six weeks.

From Perth comes the report that in about three weeks' time the supply of coal for the gas and water undertakings will be exhausted. At the Johnstone Gas-Works, there are just over two weeks' supply of coal; and it is likely that the Town Council will cut off the gas during the day. In Hamilton, it is stated there is a supply of coal at the gas-works sufficient for six or seven weeks. At Berwick-on-Tweed, there is enough coal on hand to meet present needs, although the Gas Company have issued a warning to consumers to be careful. From Stonehaven, the report is to the effect that the gas-works have at least two months' supply on hand. At the headquarters of the Vale of Leven Gas Company, there are six weeks' supply of coal in hand. On Friday, it was reported that at the Alloa Gas-Works there was at least five weeks' supply of coal in store.

The Broughty Ferry Gas Commissioners are considering ways and means for safeguarding the gas supply, as at present only sufficient coal for five weeks is available. The Kilsyth Town Council have requested shopkeepers to close their premises at six o'clock each evening, in order to husband the gas supply.

The Kirkcaldy Town Council have decided to reduce the number of lamps at present lighted. The Inverness Town Council have also inaugurated a reduced service of street lighting; there being only three weeks' supply of coal at the gas-works. The Carnoustie gas-works have at least five weeks' supply of coal on hand. From Inverurie, the report is that at the gas-works the coal will last for "several weeks." In Peterhead there is sufficient coal at the gas-works for a normal supply of gas for about six weeks. The Grangemouth Gas Commissioners this week paid 23s. per ton for coal for the gas-works, against 12s.—the usual contract price. The report from Dundee is to the effect that no curtailment of lighting is being considered, and none is likely to take place "for some considerable time to come."

From several districts reports have come regarding the price of gas coke, for which there has been an increased demand. At Dunoon, the 1 cwt. bag sold for 1s.; at Hamilton the price was raised from 9s. 2d. to 12s. per ton. At the Helensburgh Town Council, it was reported that coke was bought from the local gas-works at 8s. per ton, and sold retail from the carts by dealers at £1 6s. 8d. per ton. The Glasgow Corporation on Tuesday increased the price of riddled coke from 11s. to 16s. per ton. The Edinburgh and Leith Gas Commissioners have lately sold 200 tons of gas coke to the different departments of the Corporation.

The Gas-Works Committee of the Arbroath Town Council have had under consideration the application by the stokers at the gas-works for an increase in their wages. It was reported that the wages paid in Arbroath were, on inquiry, found to be as high as, or higher than, those paid in other towns of similar size. The application was refused; and it was remitted to the Gas Manager to ascertain which was the most modern and best type of mechanical stoking apparatus.

At the meeting of the Peterhead Town Council on Monday, there was a long, and at times somewhat acrimonious, discussion over the minutes of the Gas Committee. The Manager's report for the month of February showed an increase of 193,000 cubic feet in the manufacture of gas, as compared with the corresponding period last year. The Committee, it was reported, had resumed consideration of the application by the gas stokers for an increase of wages; and after discussing the subject very fully, and particularly in view of their being paid a higher wage than is paid in other burghs of similar size and situation, the Town Clerk was instructed to reply that no advance could be conceded. The meeting had also under consideration the duties to be performed respectively by the Town Chamberlain as Gas Treasurer and the Gas Manager; and it was resolved to recommend that the Town Chamberlain should undertake the supervision of the whole of the financial transactions of the undertaking at a salary of £150 per annum. The minute was eventually approved by 7 votes to 3.

At a meeting of the Buckhaven Town Council on Monday, Bailie Taylor reported on the municipal gas scheme; and it was left to the Committee to continue their inquiries. It was mentioned that already good progress had been made in the matter; and they were now looking for a site for the gas-works.

The water, gas, and electricity assessments of the Glasgow Corporation for 1911-12 realized £1,522,180 on Feb. 21—a net increase of £50,444 as compared with the preceding year. The increase would have been £61,168 but for a decrease of £10,724 due to the reduction

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ACADEMY STREET, WARRINGTON.

in the price of gas for the current year, and a decrease in the number of ordinary meters in use.

Suicide by means of gas poisoning has been somewhat frequent of late in Dundee. On Wednesday night, a spinner, living in Jamaica Street, was found dead. She had disconnected the rubber tube attached to a gas-stove and put it in her mouth, after turning the gas on and enveloping her face in a towel.

It has been resolved to proceed with the promotion of the Loch Ericht water and electric power scheme by means of a Private Bill instead of a Provisional Order. The capital is £450,000, in 45,000 shares of £10 each. The petitioners against the scheme include the Perthshire County Council.

Lord Provost Stevenson, speaking at the annual Grocers' Company dinner in Glasgow on Thursday night, said that it was being proved more and more that the people in the districts surrounding Glasgow were with the Corporation in the matter of amalgamation. The plebescite taken in Govan showed a majority in favour of amalgamation. Partick had already spoken; and anyone standing against amalgamation had no hope of success.

The Eastern District Committee of the Stirling County Council have signified their intention of opposing the Falkirk Town Council Extension Order.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 9.

Sulphate of Ammonia.

Owing to the miners' strike, there has been an element of uncertainty in the market throughout the week, and prices have been somewhat irregular; but on the whole the tendency has been towards higher values, especially during the last two or three days. New direct orders for export have been rather scarce, but the demand for home consumption has been fairly good. The closing quotations are £14 7s. 6d. to £14 8s. 9d. per ton f.o.b. Hull, £14 8s. 9d. to £14 10s. per ton f.o.b. Liverpool, and £14 10s. to £14 11s. 3d. per ton f.o.b. Leith. No further transactions have transpired in the forward position; but producers refuse to make any concession in prices, and are still holding for £14 10s. per ton for April-June, and for £14 5s. per ton for July-December, f.o.b. good ports.

Nitrate of Soda.

The situation of this article continues strong, and quotations on spot have now been raised to 10s. 10½d. per cwt. for ordinary and 11s. for refined quality.

LONDON, *March* 11.

Tar Products.

The markets for tar products still remain firm; but there is very little business doing owing to the coal strike. There is a small demand for pitch from the Continent, which, however, has not had any material effect on the price. Benzol remains in about the same position; and orders are scarce. Foreign consumers are not inclined to pay the prices being asked at the moment. Solvent and heavy naphthas are in good demand. Creosote maintains its price; and there is a fair amount of inquiry.

The average values during the week were: Tar, 24s. 6d. to 28s. 6d. *ex* works. Pitch, London, 46s. to 47s.; east coast, 45s. 6d. to 46s. 6d.; west coast, Clyde 45s. to 45s. 6d., Manchester 44s. 6d. to 45s., Liverpool 45s. to 46s. Benzol, 90 per cent., naked, London, 10½d. to 11d.; North, 10d.; 50-90 per cent., naked, London, 10d.; North, 9½d. Toluol, naked, London, 10d. to 10½d.; North, 9½d. to 10d. Crude naphtha, in bulk, London, 4½d. to 5d.; North, 3¾d. to 4½d. Solvent naphtha, naked, London, 11½d. to 1s. f.o.b.; North, 10½d. to 10¾d. f.o.b. Heavy naphtha, naked, London, 11d. to 1s. f.o.b.; North, 10d. to 10½d. f.o.b. Creosote, in bulk, London, 2⅞d. to 3⅛d.; North, 2½d. to 2⅝d., salty; 2⅝d. to 2¾d., liquid. Heavy oils, in bulk, 3¼d. to 3⅜d. Carbolic acid, casks included, 60 per cent., east and west coast, 2s. 9d. to 2s. 10d. Naphthalene, £4 10s. to £10; salts, 40s. to 45s., bags included. Anthracene, "A" quality, 1¼d. to 1¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

This market is also quiet, and to a certain extent there has been a decline in value. Actual Beckton is quoted to-day at £14. Outside London makes are £13 15s.; Hull, £14 7s. 6d.; Liverpool, £14 8s. 9d.; Leith, £14 10s.; Middlesbrough, £14 8s. 9d.

COAL TRADE REPORTS.

Northern Coal Trade.

The shipment of coal from the northern ports has now ceased, and there are only odd lots for sale—remnants often of cargoes that have been shipped. For such quantities, the prices vary very greatly. As much as 25s. per ton was paid for one lot of Durham coal—a record price for many years—while as much as 17s. per ton at the colliery was paid for some small coal. There are a few moderate quantities still to be seen at some of the collieries, but part is reserved for use about the pits. One or two cargoes have also been sent away, and now the docks and staiths may be said to be nearly bare of coal. It is impossible to quote prices for gas coal, as supplies are stopped; and if any were available, the values would be far above those that were current before the strike. There is a little more hope as to a settlement, but speculation would be futile yet as to the time of recommencement of work. There is a steady demand for what little coke is made. Gas coke is in fair supply, and is naturally taken up rapidly, with prices that may perhaps be tentatively put at about 17s. per ton f.o.b.

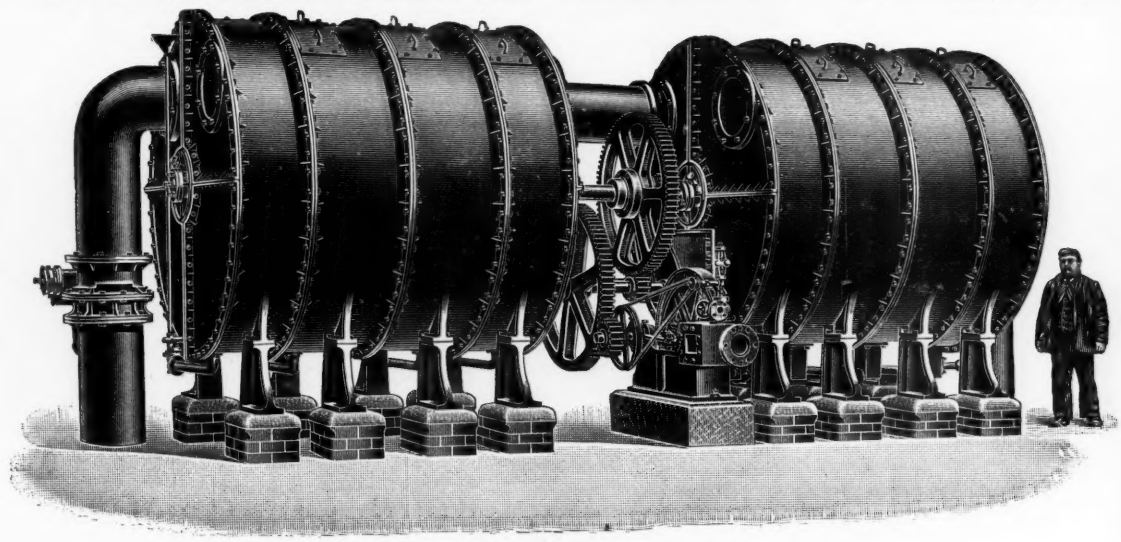
Scotch Coal Trade.

Owing to the restriction of supplies, business throughout Scotland is practically dormant. Any transactions that are being effected are the result of special bargaining, and very high prices are ruling.

ROTARY WASHER SCRUBBER.

Capacity 2,500,000 cubic feet per day,

For Gas-Works, KINGSTON-ON-THAMES. H. W. Packham, Esq., Engineer.



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Lectures to Gas-Fitters.

Under the auspices of the Special Purposes Section of the North of England Gas Managers' Association, the last of a series of four lectures to gas-fitters was given by Mr. Matt. Dunn, of Stockton-on-Tees, at the Gas Office, South Shields, last Tuesday; his subject being "Low-Pressure Incandescent Gas Lighting." The lecturer first dealt with the composition, candle power, and calorific value of coal gas, and then passed on to speak of burners, mantles, and globes, and the effect of the last on lighting efficiency. Having touched upon the reflecting power of wall papers, ceilings, and coloured surfaces, he explained the method of calculating the amount of light required for various purposes, and compared the values of ordinary low-pressure self-intensified and high-power low-pressure lighting. The lecture concluded with some remarks on the ventilating and hygienic power of gas. Mr. Dunn gave a similar lecture on the 27th ult. at Rutherford College, Newcastle-upon-Tyne. They were very successful—the attendances being large on each occasion. On the 13th and 19th inst. he will lecture at Sunderland and Stockton-on-Tees. All gas-fitters, whether employed by gas undertakings or master plumbers, are invited to attend these lectures, which are quite free.

Scarborough Gas Company and their Workmen.

Owing to the success and prosperity of the Scarborough Gas Company during the past five years, reductions have been made year by year in the price of gas, amounting to a total of 8d. per 1000 cubic feet—from 2s. 10d. to the present price of 2s. 2d. The Board, at their last meeting, decided that the workmen should also participate in the Company's prosperity; and they have therefore increased as follows the wages of the whole of the men employed at the gas-works: The stokers have received an increase of 6d. per shift; and all the other eight-hour shift men 3d. per shift. The foremen have received increases varying from 2s. 6d. up to 5s. per week. The total number of hours worked by all weekly wage men, other than shift men, has been reduced from 52 to 50½. This allows three-quarters of an hour for breakfast, instead of half-an-hour, which was considered insufficient, and brings down the number of hours worked to nearly the ideal 48 of the working classes throughout the country. All ordinary labourers' wages have been increased to a minimum of 25s. 3d. per week—being at the rate of 6d. per hour, and 3d. above the "minimum living wage." At a meeting of the men recently held at the gas-works, the Manager and Secretary (Mr. Alexander Allan, announced to them the decision of the Directors. Much gratification was expressed at it, and special resolutions were passed thanking the Directors for their voluntary liberality, and for the interest they have always shown in the welfare of their workmen.

The Empire Gas Radiator Company, Limited, has been registered with a capital of £5000, in 10s. shares.

Enfield Gas Company.

The half-yearly general meeting of the Enfield Gas Company (held on the 29th ult.) was presided over by Colonel Sir Alfred Somerset, K.C.B., who, in moving the adoption of the report and accounts, referred to the expenditure for additional services, meters, cookers, and other apparatus for using gas, as evidence of the continual demands for additional supplies; the quantity of gas sold during the half year having been 120,368,000 cubic feet, or 8,529,000 feet more than in the corresponding period of 1910, and representing a growth of 7·62 per cent. The rental brought in for gas sold was £945 more, though the rate per 1000 feet charged was 2d. less for the first quarter than in the period with which it was compared. The other principal item of capital expenditure, he said, was £813, the balance of the cost of obtaining the Company's Special Act in 1911, the total cost of which was £1568—a by no means large sum when the determined nature of the opposition overcome was considered, and the costly effect of the obligations that the Company's opponents were prevented from putting upon it was kept in mind. The capital expenditure per unit of business done stood at a lower figure than before, notwithstanding the considerable additions made to the buildings and apparatus at the works, which will cover the needs, in their respective functions, for some time to come. Mr. Alfred Ford, in seconding the motion, stated that the total number of consumers at the present time was 10,370—a growth of 438 since the corresponding period of 1910. The prepayment meters numbered 8129, the public lamps supplied 1032, and the cookers 7189. The consumption per slot meter for the half year was 6833 feet. The unaccounted-for gas for the six months was 7·28 per cent., and for the year 5·27 per cent., of the gas made. A sum of £400 had been placed to the special purposes fund, and £500 to the reserve fund. The unappropriated balance, after providing for the dividend, amounted to £11,521. The motion was agreed to, and a dividend at the rate of 5 per cent. per annum on the consolidated preference stock and 5½ per cent. per annum on the consolidated ordinary stock was declared. Votes acknowledging the services of the Directors and of the General Manager and staff were passed, and responded to by Mr. Ford for the Board, and by Mr. C. W. Offord (the General Manager) for the staff. Mr. Offord compared the figures of the year just ended with those of 1901, from which it appeared that the quantity of gas sold had increased from 109,960,000 to 235,736,000 cubic feet, the consumers from 2759 to 10,370, the gas-cookers in use from 1121 to 7189, and the prepayment meters from 1206 to 8129; while the price of gas to ordinary consumers had been reduced from 4s. to 3s. 1d. per 1000 cubic feet.

Gas Profits at Belfast.—The Belfast Borough Council have passed a resolution authorizing the Gas Committee to grant £10,000 from the profits of the gas undertaking towards the relief of the rates, together with the amount necessary for payment of dividends and interest on capital expenditure in connection with the City Hall. The latter sum, it is stated, is £11,400.

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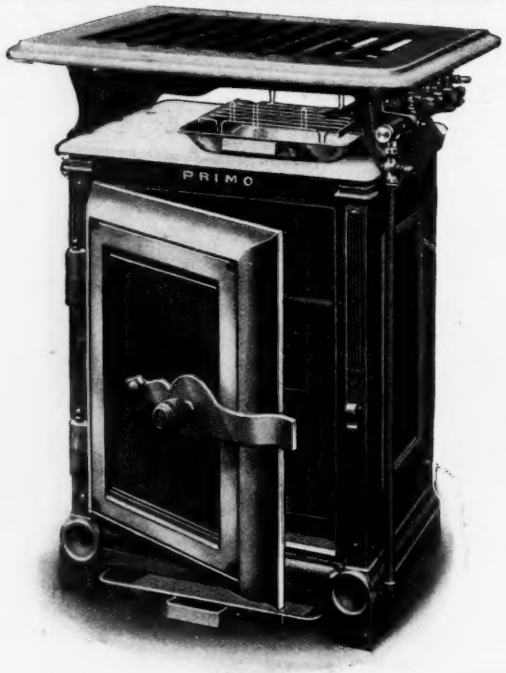

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Doncaster Gas Affairs.

At the meeting of the Doncaster Town Council last Thursday, the Gas Committee brought forward a recommendation with reference to the proposed acceptance of the tender of Messrs. Clayton, Son, and Co. for the supply and erection of a new gasholder. They reported that the two alternative schemes, with drawings relating thereto, had been submitted to the Local Government Board for consideration, and recommended that application be made to the Board for permission to borrow the sum of £9668 or £9068, according to which tender the Board preferred to select. It was reported that the Board had written that they would prefer the Corporation should themselves select the type of holder. It was then decided that a three-lift guide-framed gasholder (84 ft 9 in. high), with steel tank (110 feet in diameter), and foundations, at the price of £9668, be accepted. It was recommended that the Town Clerk be authorized to take the necessary steps to oppose the clauses of the Bawtry and District Gas Bill, which seeks power to supply gas in the parishes of Loversall and Rossington—the former being in the Corporation's present authorized limits of supply. The Town Clerk thereupon reported that he had succeeded in obtaining an undertaking from the promoters of the Bill to withdraw from the proposed limits of supply the parish of Loversall, whereupon it was resolved that no further steps be taken to petition against the Bill. The report was adopted.

A Municipal Electrical Fittings Shop.

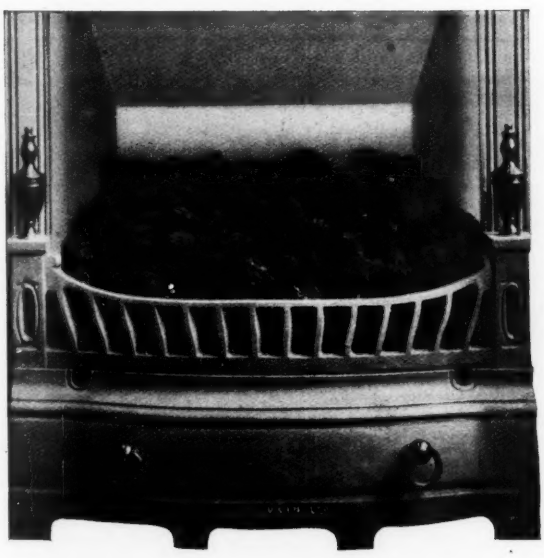
Under this heading, the following remarks on the Sheffield municipal trading case reported in the "JOURNAL" for the 27th ult. (p. 600) appeared in the "Ironmonger" last week: "Those members of the City Council of Sheffield who have some respect for the rights of private traders are probably beginning to feel sorry that, in their corporate capacity, they ever set up a shop for the sale to all and sundry of electrical cigar-lighters, hair-curlers, and other elegant and useful trifles in the 'electrical fittings' line. By starting such shopkeeping with the ratepayers' money, they first of all destroyed the living or crippled the business of a number of their citizens; secondly, they showed themselves to be actuarially incompetent tradesmen; and, thirdly, they brought upon themselves an action-at-law, in which judgment has just been given against them, with costs, in the Chancery Division of the High Court. The Municipality may appeal to the House of Lords; but on this subject its constituents may have a word to say. Possibly also, before such an appeal can be heard, assuming it to be lodged, the Bill which confers upon the city authorities those powers which Mr. Justice Eve has decided they do not at present possess, may have become an Act of Parliament. But here again the Council will have to reckon with the watchfulness of several determined opponents of extreme municipal trading, who will see to it that the Bill, which was read a second time in the House of Commons on Feb. 28, will not pass through the Legislature unchallenged."

Commercial Production of Calcium Cyanamide.

Meetings of shareholders of the Alby United Carbide Factories, Limited, were recently held to sanction the increase of the capital from £400,000 to £550,000. It was explained by the Chairman (Mr. A. E. Barton) that the additional capital was desired in order to provide funds for the extension of the Odda carbide plant to a capacity of 80,000 tons per annum, and to be able to enter into a contract for the supply of about 87,000 tons of carbide per annum for thirty years, for conversion into cyanamide. This contract had been provisionally settled with the Nitrogen Fertilizers, Limited. The North-Western Cyanamide Company, in which the Alby United Carbide Factories held nearly half the shares, had practically completed negotiations for increasing the capacity of the cyanamide plant at Odda to about 73,000 tons per annum. This plant would be acquired by the Nitrogen Fertilizers, Limited, who would also obtain a licence from the North-Western Cyanamide Company to manufacture in Norway and Sweden up to 88,000 tons of cyanamide yearly, and sell it in all the territories of the Company, paying them a royalty of 10 per cent. on the net selling price at the works. With regard to the future of the cyanamide industry, the consumption of artificial manures was increasing by leaps and bounds. The attention of chemists had been turned to the unlimited supply of nitrogen in the air; and, after considerable research, an economical method of making it available was discovered by Professor Frank and Dr. Caro, by fixing the nitrogen in carbide of calcium. This product—calcium cyanamide, or nitrolim—could be placed on the market at a lower figure than that ruling for any other nitrogenous fertilizer, while at the same time assuring a handsome profit to the manufacturer. That the value of nitrolim was universally recognized was proved by the enormous demand that had arisen from practically all parts of the world.

Birkenhead Extensions.—The Birkenhead Town Council's extension scheme was the subject of an inquiry conducted by Mr. P. M. Crosthwaite, on behalf of the Local Government Board, last Wednesday, relative to the Corporation's application for sanction to borrow £32,253. The Corporation are in possession of a Provisional Order, dated October, 1908, authorizing the expenditure of £114,000 upon the extension of the manufacturing and storage plant at the central gasworks, and to acquire land to establish subsidiary works; and this is the first instalment of the scheme. The proceedings were of a formal nature; and after hearing evidence, the Inspector visited the site of the proposed new gasholder station in Laird Street in the north end. The instalment which was the subject of the inquiry provides for the laying-out of a complete storage station on the Laird Street site, involving the construction and erection of a four-lift gasholder and gasholder tank, weigh-house and bridge, boiler-house, governor-house, boundary walls, and two cottages, and the laying of a high-pressure main from the central works to the new station, with boosting-plant at the former.

In the Matter of Appearance.



In the matter of appearance the "St. Nicholas" Fire is a revelation. It looks exactly like a glowing, cheerful Coal Fire.

It fits any grate and brings all the advantages of gas heating without offending the æsthetic susceptibilities of people who object to the ordinary Gas Fire, however artistic it may be, standing out in front of the Fireplace.

One of these fires fitted in your Showroom would attract a good deal of attention and ensure a large number of new consumers of gas for heating.

R. & A. MAIN, LIMITED,

WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.; 136, Renfield Street, GLASGOW; 56, Broad Street, BIRMINGHAM; 83, Old Market Street, BRISTOL; 13, Whitworth Street West, MANCHESTER; 8, Exchange Place, Donegall Street, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

City of London Improved Public Lighting.

At the Savoy Hotel, last Friday, the members of the Streets Committee of the Corporation of London, at the invitation of Mr. G. Gordon Stanham, the Chairman, met the Lord Mayor and Sheriffs at dinner. The toast of "The Lord Mayor, Sheriffs, and Corporation" was proposed by Sir Thomas Skewes-Cox, J.P., who remarked that the streets of the City were well lighted; and the more gas they burnt the more they would show their wisdom in establishing in the City of London the best illuminants. The Lord Mayor proposed "The Chairman," and in doing so observed that the lighting and cleansing of the streets had made the City a model. He had been through nearly all the cities of Europe, and a great many in America, but he had not seen anything to be compared with the City of London. Therefore they were especially grateful to the Streets Committee for the services they rendered to the community. Mr. Gordon Stanham, in acknowledging the toast, paid a tribute to the excellent manner in which he was assisted by the officers.

Milnrow Gas Company's Increased Dividend.—The Directors of the Milnrow Gas Company have decided on an increase of the dividend on the original 10 per cent. shares from 7 to 8 per cent. for the last half year; the dividend on the new 7 per cent. shares being retained at the previous figure of 5 per cent. At the meeting of shareholders, when the report and dividends were approved, the Chairman (Mr. E. Clegg) said the Directors were looking forward to a considerably increased demand for gas, by reason of the development of the district.

Mr. N. H. Humphrys on the Vitiation of the Atmosphere.—Last Thursday evening, Mr. Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S., the Engineer and Manager of the Salisbury Gas Company, gave a lecture on "The Vitiation of the Atmosphere" to the employees of the Company. It was illustrated by diagrams and experiments. The Chairman of the Company (Mr. G. Fullford) presided, and, in introducing the lecturer, said he was known as an authority on technical matters throughout the country, and in this connection had done excellent work which had not only benefited the gas consumers and the Company in Salisbury, but had tended to the general advancement of the gas industry. Mr. Humphrys commenced by explaining the meaning of the title of his lecture; insisting on the importance of pure air, and tracing, with the aid of a diagram, some of the principal sources by which air is rendered impure. Referring to the air required for the combustion of coal, and the smoke and other impurities given off—impurities which were extracted from coal gas at the works before it was sent out—he explained in detail the composition of coal gas, the air required, and the products of combustion. He showed by the aid of a model that a gas-flame is a powerful aid to ventilation, and said this explained why the air in gas-lighted rooms had been found to be quite as pure as in others. He also pointed out the flame acted as a sterilizer in burning up and neutralizing any organic matter that passed through it. A vote of thanks was accorded to Mr. Humphrys for his lecture.

Portchester Water Supply.—The Fareham Rural District Council have approved of their Water Committee's recommendation to assent to the Portsmouth Water Company's intention to obtain a Provisional Order for extending their mains to Portchester. This will meet the desire of the Admiralty, whose officials some time since called upon the Council to furnish an efficient water supply to the Portchester district—a demand which could not then be complied with.

Pontefract without Water.—The inhabitants of the greater part of the district served by the Pontefract Corporation Water Committee were last Wednesday for the greater part of the day absolutely without a supply, except such as was to be obtained from wells. It was explained at the meeting of the Council in the evening that the previous Sunday afternoon the delivery-pipe next to the ram of the engine at the Roall works burst, and threw the engine out of action. Unfortunately, the gravity of the occurrence was not realized; and it was not until Monday evening, when complaints as to shortness of water began to reach the Municipal Offices, that the officials knew anything of the mishap. The Borough Surveyor (Mr. J. E. Pickard) and the Chairman of the Water Committee (Mr. T. Butler) drove down to the works, a distance of seven miles, and the necessary repairs were taken in hand. But it was not until Wednesday night that the whole of the damage done could be replaced; and meantime the reservoirs had long been dry.

Nuneaton Water Supply.—At the meeting of the Nuneaton Town Council last Wednesday, the Water Committee announced that they had considered a report from the Engineer (Mr. F. C. Cook) on the progress of the work at the new water sinkings at Griff. It showed that the yield of water had been materially increased as the result of the headings driven from the bottom of the well, and that the water pumped now averaged 16,000 gallons per hour. In view of the rapidly increasing demand on the existing sources of supply, the Committee were of opinion that steps should be taken at once to complete the scheme; and they recommended that application should be made to the Local Government Board for sanction to increase the amount of the loan already granted—viz., £5000—to £15,000, which would provide for a further extension of headings, the laying of the necessary main, the equipment of the pumping-station, and the payment of the balance of £1500 to the Trustees of the Aubrey Estate in respect of the purchase of site and wayleaves. Alderman Johnson, in moving the adoption of the report, said he considered the yield had sufficiently increased to justify the Council in proceeding with the scheme. Mr. Whiteman thought the matter should be adjourned for six months, till they could see what the yield of water would be in the summer. He said he did not like embarking on such a costly scheme if, after all, it should prove to be a failure. In reply to questions, the Surveyor said he thought the additional supply would provide for the needs of the town, at the present rate of progress, for about another ten years. The Mayor (Mr. T. Horton) said the only alternative would be to apply to Birmingham for a supply from Shustoke. The Council had consulted Professor Lapworth, who had advised them to sink where they had done. The report was adopted.

GEYSER MAINTENANCE.

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'Improved Teba' Geyser

(1912 Pattern)

Solves the Maintenance Difficulty

owing to the fact that the interior is detachable, enabling Heating Chambers to be cleaned or renewed, and repairs effected at a very small cost.

EVERY PART STANDARDIZED & INTERCHANGEABLE.

These are the Machines for your HIRE LIST.

THE PARKINSON STOVE CO., LD.

(Incorporating Maughan's Patent Geyser Co.)

BIRMINGHAM & LONDON.

Kingskerswell Lighting Scheme.—Owing to the opposition of the Kingskerswell Parish Council, it has been decided by the Torquay Town Council not to proceed with the Provisional Order by which it was proposed to obtain powers for the extension of the gas-mains from St. Mary Church to Kingskerswell.

Free Maintenance and Cheaper Power Gas at Nelson.—The Nelson Corporation Gas Department have decided to undertake, from the 1st prox., the free maintenance of all gas appliances in use by the consumers in the area of supply. This step has been rendered necessary by the fact that the department frequently receives complaints which are attributable to badly-designed and wrongly-adjusted fittings. The present rate for gas for power purposes is 2s. per 1000 cubic feet net. A reduction has been decided upon, and will come into force on the above-named date, when the net rates will be as follows: Any quantity up to 500,000 cubic feet per annum, 2s.; 500,000 and 1,000,000 cubic feet, 1s. 9d.; above 1,000,000 cubic feet, 1s. 6d.

Municipal Coal Supply.—At a meeting of the Morley Town Council on Monday last week, Mr. Percy Marshall moved that the Corporation establish a municipal coal supply, and that for this purpose they should instruct the Gas Committee to include such a quantity in their next coal contracts as to be in a position to supply the citizens of the borough with their requirements at a reasonable cost. He said the problem facing them was how they were to pay for the increasing services demanded by the public and imposed upon them by Acts of Parliament; and, in view of the heavy burdens borne by the ratepayers, it behoved the Corporation to lighten these burdens. One of the best means of doing this was to establish a municipal coal supply, and thereby provide them with coal at a much cheaper rate than that at which they could obtain it from middlemen. The motion was defeated by a large majority; only three voting in its favour.

Oswestry Water Supply.—The Chairman of the Water Committee of the Oswestry Town Council (Alderman Smith) furnished, at the last meeting of the Council, some particulars in regard to the water supply last year. He said he found that the total consumption was 105 million gallons, and the waste had been reduced from 22 million to 11·4 million gallons. The trade consumption by meter amounted to 31·4 million gallons; while the water used for domestic purposes was 74 millions, or 67 per cent. of the whole. The total income was £2278, of which the traders paid £727 and the domestic users of water £1551. The domestic supply worked out at 5d. and the traders' supply at 10½d. per 1000 gallons. The Cambrian Railways Company used 31,352,000 gallons of water, for which they were charged at the rate of 4d. per 1000 gallons. He thought there was no reason in this; and when the agreement expired, he considered the terms should be revised. The total expenditure was £1870; and they had made a profit of £400. The net cost worked out at 4½d. per 1000 gallons; so the Council would see that they supplied the Cambrian Company at ¾d. per 1000 gallons less than the water actually cost the town. During the dry weather they had to pay the Liverpool Corporation 6d. per 1000 gallons for water, and supply it to the Company at 4d. In the subsequent remarks, it was explained that the Company were granted special terms with the view of retaining their works in the town.

APPLICATIONS FOR LETTERS PATENT.

4618.—Nicoud, J. D., "Automatic supply of gas for water-heating." Feb. 23.
4637.—Pendlebury, J., "Stop-taps." Feb. 24.
4700.—Siemens-Schuckertwerke G.m.b.H., "Gas-pumps." Feb. 24.
4721.—Hartley, W., "Incandescent burners." Feb. 26.
4722.—Ordish, F. W., and Dempster, R., and Sons, Limited, "Telpher switches." Feb. 26.
4763.—Cohn, S., "Mantles." Feb. 26.
4772.—Cohn, S., "Sewing mantles." Feb. 26.
4782.—Cohn, S., "Mantles." Feb. 26.
4895.—Fuwa, K., "Gas-producer." Feb. 27.
4908.—Boult, A. J., "Automatic production of water gas." A communication from the Soc. Anon. des Brevets Magnée. Feb. 27.
4916.—Haddan, R., "Igniting burners." A communication from the Soc. Anon. des Etablissements "Kurios." Feb. 27.
4937.—Vaughan, R. W., "Mantles and boxes." Feb. 28.
4956.—Fletcher, F. M., "Pressure generator by gas." Feb. 28.
4965.—Bernardy, E., "Incandescent burners." Feb. 28.
4969.—Harrop, G., "Bunsen burners." Feb. 28.
5024.—Testrup, N., and Rigby, T., "Gas-producers." Feb. 28.
5039.—Woodroffe, F. K., and Boultbee, H. W., "Automatically analyzing a gas volumetrically, and recording the same." Feb. 29.
5047.—Kahlert, G., "Producing gas." Feb. 29.
5062.—Anderson, H., "Lighting gas." Feb. 29.
5080.—Marks, E. C. R., "Gas-producer systems." A communication from the Standard Gas Power Company. Feb. 29.
5100.—Nehmer, F., "Lighting gas." Feb. 29.
5119.—Wright, W. H., "Gas-heated irons." Feb. 29.
5129.—Betegh, P., "Gas-fittings." Feb. 29.
5139.—Lion, G. P. J., "Carburetting air with crude naphthalene." Feb. 29.
5148.—Eslon, V. E., and Olsen, C., "Diffusing light." Feb. 29.
5167.—Callaway, E., and Millar, Dennis, and Co., "Plug-cock." March 1.
5184.—Waddell, A., "Gas-piping." March 1.
5194.—Simcock, H., "Gas and air mixer." March 1.
5197.—Lamkin, A. E., and Mead, F., "Gas-producers." March 1.
5238.—Schitzkowsky, M., "Bending pipes." March 1.
5256.—Yarrow, M., "Joints of pipes." March 2.
5259.—Ingram, J., "Connecting service-pipes to mains." March 2.
5305.—Sackett, J., "Production of gas." March 2.
5311.—Grundy, H. H., "Thermostats." March 2.
5343.—Tattersall, A. R., and Archbold, A. P. J., "Distilling wood, peat, and other substances." March 2.

Gas Managers

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COOKER QUALITY

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CARRON, STIRLINGSHIRE.

SHOW-ROOMS: LONDON (City)—15, Upper Thames Street, E.C.; (West End)—23, Princes Street, Cavendish Square, W.; 3, Berners Street, W.; LIVERPOOL—22-30, Redcross Street; MANCHESTER—24, Brazennose Street; GLASGOW—125, Buchanan Street; EDINBURGH—114, George Street; BRISTOL—6, Victoria Street; NEWCASTLE-ON-TYNE—13, Prudhoe Street; BIRMINGHAM—218, 220, 222, Corporation Street; DUBLIN—44, Grafton Street.

CARRON COMPANY · ESTO PERPETUA · FOUNDED 1759 · INCORPORATED BY ROYAL CHARTER 1773 ·

Richmond Gas Stove and Meter Company, Limited.

The report presented by the Directors of this Company at the twenty-first annual general meeting, held at Warrington last Thursday, showed that the balance standing to the credit of the profit and loss account, after deducting the debenture interest, was £32,621, inclusive of the amount brought forward. This they recommended should be appropriated as follows: Depreciation of plant, £5609; dividend on preference capital at the rate of 6 per cent. per annum (less income-tax), £5881; divided on ordinary capital at the rate of 10 per cent. per annum (free of income-tax), £8162; bonus of 6d. per ordinary share, £2040; addition to the reserve fund (bringing it up to £45,000), £5000—making a total of £26,692, and leaving £5929 to be carried forward, subject to the Directors' remuneration. It was stated that the continued success of the Company compelled the Directors to make further extensions at the Grappenhall works; and additional buildings are in course of erection for castings, stores, fitting and grinding shops, &c. The Chairman (Mr. T. Dwerryhouse), in moving the adoption of the report, said he thought the shareholders would agree, after perusing it and the accounts, that the past year had been a good one for the Company. Competition was as keen as ever; but, having the services of a highly trained and efficient staff, they were not afraid to meet it. This was the twenty-first annual meeting; and from small beginnings a strong and reliable Company had been produced. During the past ten years (including the year under review), the sum added to capital was £12,979; there had been additions to the buildings, plant, &c., amounting to £78,231; there had been written off buildings, plant, &c., as depreciation, £50,166; there had been added to the reserve fund £35,000; and they had paid a dividend averaging 11¼ per cent. The Chairman concluded by referring to the several items of the balance-sheet. Mr. H. M. Thornton (who is the Vice-Chairman and Managing Director), in seconding the motion, said the business the Company did was largely made up of apparatus for gas cooking and heating. Cooking-stoves had been in general use for a long time. But it was only in very recent years that heating by gas had become popular; and, in the opinion of the Directors, it was destined to be far more so. It was in this direction that they were looking for a large proportion of their future profits. He mentioned this because the Company were successful last year in securing two of the largest contracts in gas-fires which he supposed had ever been given out to one firm of manufacturers. He was referring to the two great centres of population, Manchester and Liverpool. After mentioning the formation and objects of the British Commercial Gas Association, he concluded by saying that all the Company had done in the past could only have been accomplished by the entire staff and all associated with it working in full harmony; and he knew of nothing that would destroy it. The motion was carried unanimously. A dividend at the rate of 10 per cent per annum, with the bonus of 6d. per share, was declared; £700 was placed at the disposal of the Directors for their services during last year; and the proceedings concluded with votes of thanks to the Chairman, the Managing Directors (Messrs. Thornton and Ransome), the Secretary (Mr. J. W. Slack), and the staff, including Mr. J. William Glover and his son.

Gas Pumping Plant for the Battle Water-Works.—The Battle Urban District Council having applied for sanction to borrow £1250 to defray the cost of substituting suction-gas plant at the water-works for the present steam pumping system, a Local Government Board inquiry on the matter was held at the Council Room last Tuesday. Mr. C. Sheppard (Chairman of the Water Committee) stated that the present plant, put down about ten years ago, had become obsolete, and it was proposed to replace it by a suction-gas plant. One object was to give them duplicate plant in case of a breakdown, and another to economize. Last year the cost of coal was £225 13s.; and the estimated annual cost of working the new plant was about £26.

GAS COMPANIES' STOCK AND SHARE LIST.

The past week has been a somewhat remarkable one on the Stock Exchange. It was the first whole week of the coal strike; and though from start to finish there was nothing of any sort to indicate how long it might be likely to last, markets preserved their calm tempered with prudent caution. It was a good indication of their intrinsic strength and freedom from embarrassing elements that they could show a brave and confident front. Indeed, prices in the leading departments closed at an advance. The opening day was very quiet, and operators seemed generally disinclined to deal. Government issues languished, and Consols fell ⅛. Rails were flat at lower figures. Later on there came some recovery, but not enough to cancel losses. Tuesday showed a marked improvement, owing to hopeful views being entertained of the coal situation. Gilt-edged issues were strong, Consols rose ¼; and Rails, after a little hesitation, went ahead. This continued on Wednesday, and most markets were cheerful, insisting that the strike could not last long. Government issues advanced; and Rails pursued the up line merrily. Thursday did not open so enthusiastically; people want to see a settlement looming ahead. But Rails presently recovered from their disappointment, and firmness was the rule. Friday also was optimistic and more free from realizations than ordinarily. Consols rose ¼; and markets seemed to feel the spring. There was not much doing on Saturday; but there was no reaction, and markets closed with general strength. Consols left off at 77¾-78—a rise of ⅜ in the week. The Money Market was quite strong, with a lasting demand that bolstered rates up nicely, and discount terms hardened steadily. Business in the Gas Market was brisk and active, with a strong tendency which set a considerable number of quotations advancing. This was the more noticeable in the secured issues of several undertakings, which, in common with choice securities of their own rank in other markets, have for so long past been standing at reduced figures. In Gaslight and Coke, the ordinary stock was bright and active at rather better prices, ranging from one special bargain at 103 to 104¼—a rise of ¼. The secured issues were unchanged; the maximum realizing 84¼ and 85, the preference from 103 to 103⅜, and the debenture 79⅛ and 79¾. South Metropolitan was more active, and was firm at 114½ to 115¼. The debenture marked from 79⅛ to 79½. In Commercials, there were dealings in the 4 per cent. at 108½ to 109¼, and one in the 3½ per cent. at 104. Among the Suburban and Provincial group, Alliance and Dublin changed hands at 80¾ special and 81½, Brighton original at 219, and ditto ordinary at 157½ (a rise of 1 in each), and South Suburban at 121⅛ and 122. In the Continental companies, Imperial was marked at 190 to 191, ditto debenture at 89, Union preference at 133½, and European at 20 to 20 7/16. Among the undertakings of the remoter world, Bombay was done at 6⅜, Buenos Ayres debenture at 94½ and 95 (a rise of 1), Cape Town preference at 4 (a fall of ½), Monte Video at 12 1/16, Primitiva at 7 11/16 and 7⅞, ditto preference at 5 5/16 to 5 15/32 (a rise of 1/16), and San Paulo at 11 15/32 and 11½.

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Oct. 12	5	Alliance & Dublin Ord.	79—82	..	6 1 11
374,000	Stk.	Jan. 12	4	Do. 4 p.c. Deb.	91—93	..	4 6 0
250,000	5	Sept. 28	7	Bombay, Ltd.	6⅜—6⅝	..	5 5 8
50,000	10	Feb. 29	15	Bourne- mouth Gas & Water Pref. 6 p.c.	28½—29½*	..	5 1 8
332,000	10	"	7		16—16½*	..	4 4 10
75,000	10	"	6		14—14½*	..	4 2 9
380,000	Stk.	"	13	Brentford Consolidated	258—263*	..	4 18 10
330,000	"	"	10	Do. New	195—200*	..	5 0 0
50,000	"	"	5	Do. 5 p.c. Pref.	118—120*	..	4 3 4
206,250	"	Dec. 14	4	Do. 4 p.c. Deb.	97—99	..	4 0 10
219,055	Stk.	Feb. 29	11	Brighton & Hove Orig.	215—220*	+1	5 0 0
244,200	"	"	8	Do. A Ord. Stk.	156—159*	+1	5 0 8
490,000	20	Sept. 28	12½	British	45½—46½	+½	5 7 6
120,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb. Stk.	93—95	..	4 4 3
109,000	"	Feb. 15	6	Bromley, A 5 p.c.	126—131	..	4 11 7
165,700	"		4½	Do. B 3½ p.c.	98—101	..	4 9 1
82,278	"	"	5½	Do. C 5 p.c.	117—120	..	4 11 8
55,000	"	Dec. 29	3½	Do. 3½ p.c. Deb.	80—82	..	4 5 4
250,000	Stk.		4	Buenos Ayres 4 p.c. Deb.	95—97	+1	4 2 6
100,000	10	"	—	Cape Town & Dis., Ltd.	2—3	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	4—5	−½	—
100,000	Stk.	Dec. 29	4½	Do. 4½ p.c. Deb. Stk.	76—80	..	5 12 6
157,150	Stk.	Feb. 15	5	Chester 5 p.c. Ord.	110—112	..	4 9 3
1,513,380	Stk.	Feb. 29	5/9/4	Commercial 4 p.c. Stk.	107½—109½*	..	5 0 6
560,000	"	"	5½	Do. 3½ p.c. do.	103—105*	..	5 1 6
475,000	"	Dec. 14	3	Do. 3 p.c. Deb. Stk.	75—77	..	3 17 11
800,000	Stk.	"	4	Continental Union, Ltd.	82—85	..	4 14 2
200,000	"	"	7	Do. 7 p.c. Pref.	132—134	..	5 4 6
492,270	Stk.	"	5½	Derby Con. Stk.	122—124	..	4 8 9
55,000	"	—	4	Do. Deb. Stk.	104—105	..	3 16 2
840,150	10	Jan. 31	10	European, Ltd.	20—21	..	4 15 3
16,160,600	Stk.	Feb. 15	4/14/8	Gas-light & Coke	103½—104½	+½	4 10 9
2,600,000	"	"	3½		83½—85½	..	4 1 10
4,062,235	"	"	4		102—104	..	3 16 11
4,531,705	"	Dec. 14	3	Coke 3 p.c. Con. Deb.	79—81	..	3 14 1
258,740	Stk.	Sept. 14	5	Hastings & St. L. 3½ p.c.	95—97	..	5 3 1
82,500	"	"	6½	Do. do. 5 p.c.	—	..	—
70,000	10	Oct. 12	11	Hongkong & China, Ltd.	17—17½	..	6 5 9
131,000	Stk.	Sept. 14	7½	Ilford A and C	155—158	..	4 14 11
65,780	"	"	6	Do. B	126—129	..	4 13 0
65,500	"	Dec. 29	4	Do. 4 p.c. Deb.	92—94	..	4 5 1
4,940,000	Stk.	Nov. 10	9	Imperial Continental	189—192	..	4 13 9
1,235,000	Stk.	Feb. 15	3½	Do. 3½ p.c. Deb. Red.	88—90	..	3 17 9
200,242	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c.	127—132	..	4 10 11
561,000	Stk.	Feb. 29	10	Liverpool United A.	219—221*	..	4 10 6
718,100	"	"	7	Do. B.	159½—161½*	..	4 6 8
306,083	"	Dec. 29	4	Do. Deb. Stk.	100—102	..	3 18 5
75,000	5	Dec. 14	6	Malta & Mediterranean	4¾—5	..	6 0 0
560,000	100	Oct. 2	5	Met. of 5 p.c. Deb.	100—102	..	4 18 0
250,000	100	"	4½	Melbourne 4½ p.c. Deb.	100—102	..	4 8 3
541,920	20	Nov. 10	3½	Monte Video, Ltd.	12—12½	..	5 12 0
1,775,892	Stk.	Feb. 15	4⅜	Newc'tle&G'tesh'd Con.	100—101	..	4 6 8
529,705	Stk.	Dec. 29	3½	Do. 3½ p.c. Deb.	86—88	−1	3 19 7
55,940	10	Feb. 29	7/7/0	North Middlesex 7 p.c.	14—15*	..	4 18 0
300,000	Stk.	Dec. 14	8	Oriental, Ltd.	137—139	..	5 15 1
60,000	5	Sept. 28	8	Ottoman, Ltd.	7½—7⅝	..	5 3 3
31,800	53	Feb. 29	13	Portsea Island A	137—140*	..	4 18 4
60,000	50	"	13	Do. B	130—133*	..	4 17 9
100,000	50	"	12	Do. C	127—130*	..	4 12 4
398,490	5	Oct. 12	8	Primitiva Ord.	7⅛—7⅜	..	5 3 3
796,980	5	Dec. 29	5	Do. 5 p.c. Pref.	5¼—5½	+1/16	4 10 11
488,900	100	Dec. 1	4	Do. 4 p.c. Deb.	97—99	..	4 0 10
312,650	Stk.	Dec. 29	4	River Plate 4 p.c. Deb.	95—97	+1	4 2 6
250,000	5	Sept. 28	12	San Paulo, Ltd.	11—11½	..	5 4 4
115,000	10	"	6	Do. 6 p.c. Pref.	11½—12	..	5 0 0
125,000	50	Jan. 2	5	Do. 5 p.c. Deb.	50—51	+1	4 18 0
135,000	Stk.	Aug. 31	10	Sheffield A	240—242	..	4 2 8
209,984	"	"	10	Do. B	239—241	..	4 3 0
523,500	"	"	10	Do. C	239—240	..	4 3 4
90,000	10	Sept. 28	6	South African	8—9	..	6 13 4
6,429,895	Stk.	Feb. 15	5/9/4	South Met., 4 p.c. Ord.	113½—115½	..	4 14 8
1,895,445	"	Jan. 12	3	Do. 3 p.c. Deb.	78—80	..	3 15 0
209,820	Stk.	Feb. 29	8½	South Shields Con. Stk.	156—158*	..	5 7 7
605,000	Stk.	Feb. 15	5/16/8	S'th Suburb'n Ord. 5 p.c.	121—123	..	4 14 9
60,000	"	"	5	Do. 5 p.c. Pref.	117—120	+2	4 3 4
117,058	"	Jan. 12	5	Do. 5 p.c. Deb. Stk.	119—121	..	4 2 8
502,310	Stk.	Nov. 10	5	Southampton Ord.	107—109	..	4 11 9
120,000	Stk.	Feb. 15	7½	Tottenham A 5 p.c. and B 3½ p.c.	144—147	..	4 17 0
483,940	"	"	5⅝		114—116	..	4 17 0
149,470	"	Dec. 29	4	Edmonton 4 p.c. Deb.	95—97	+1	4 2 6
182,380	10	"	5	Tuscan, Ltd.	8⅜—8⅞	..	5 12 8
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
236,476	Stk.	Feb. 29	5	Tynemouth, 5 p.c. max.	112—114*	..	4 7 9
255,636	Stk.	"	6⅝	Wands- worth B 3½ p.c. 8 p.c. Deb. Stk.	141—144*	..	4 15 6
85,766	"	Dec. 29	3		71½—73½	..	4 1 8

Prices marked * are "Ex. div."

The half-yearly conference of representatives of the Richmond Gas-Stove Company was held recently—Mr. H. M. Thornton presiding; and afterwards the representatives and staff at Warrington were entertained to dinner by the Directors.

In boring an artesian well for a laundry at Stonebridge Park, near Willesden Junction, oil has been discovered at a depth of 1600 feet. The "Petroleum World" says the oil is not found in quantity; but the circumstances are such as to mark the discovery as possibly a most important one.

The Directors of Messrs. Fletcher, Russell, and Co. recommend a dividend at the rate of 6 per cent. per annum for the half year ended Dec. 31 last on the preference shares, making, with the interim dividend, 6 per cent. for the year, and 5 per cent. per annum on the ordinary shares for the year, less income-tax.

At a recent sale, conducted by Mr. F. W. Halsall, six lots of shares in the Prescot Gas Company were disposed of. "A" shares (£12 10s.), fetched £24 10s. and £24 15s. each; "B" shares (£10), £15 7s. 6d. each; £120 of 5 per cent. preference "C" stock, £130; and some 4 per cent. preference "C" stock was sold at par.

Including £4674 brought forward, the accounts of the Davis Gas-Stove Company, Limited, for the year 1911 show a net profit of £19,249. The sum of £6000 has been added to the reserve (increasing it to £36,000); and the Directors recommend a further dividend of 5 per cent., making 7½ per cent. for the year, and carrying forward £4957.

The Directors of Stewarts and Lloyds, Limited, after setting aside £70,000 for depreciation, recommend a dividend for the half year ended Dec. 31 of 10 per cent. per annum on the preferred ordinary shares, and a dividend for the year 1911 of 1s. per share on the deferred shares, placing £70,000 to the reserve fund, and carrying forward £86,500. A year ago, £70,000 was set aside for depreciation, the dividends were the same, and £83,060 was carried forward.

As an example of the rapid growth of Canadian cities, Regina, the capital of the province of Saskatchewan, is mentioned in a paragraph in the current number of the "Journal of the Royal Society of Arts." Nine years ago, the place had no importance, and a population of only a few hundreds. It has now developed into a busy centre, with 30,000 inhabitants. The Municipality has spent £250,000 on street and other improvements; and works which will ensure a supply of water to a population of at least 100,000 are in hand, the machinery and piping for which are being imported from England.

After transferring £10,000 to the reserve and setting aside £5000 for the improvement of the existing public lamps, the Directors of the San Paulo Gas Company, Limited, recommend a final dividend of 6 per cent., free of tax (making 12 per cent. for the year 1911), carrying forward £11,546.

The Incandescent Heat (Foreign Patents) Syndicate, Limited, has been registered with a capital of £2030, in 200 preferred £10 shares and 600 deferred 1s. shares, to carry on the business of makers and builders of furnaces, heating or combustion chambers, and plant connected with the generation of heat.

The Directors of the Monte Video Water-Works Company, Limited, have declared a final dividend on the 37,500 old shares of 5 per cent., free of tax, making 8 per cent. for the year; and £10,000 is placed to the reserve fund. For the preceding year, the dividend was also 8 per cent., and £10,000 was placed to reserve.

The gas stokers at the Pelton Colliery gas-works came out on strike with the miners, and in consequence Pelton Fell has had no gas for either public or private lighting. The owners of the colliery, however, have temporarily lighted up with electricity the fine Institute they built three years ago, so that the hall, reading, billiard, games, and other rooms are still available for use, and are crowded daily and nightly with striking miners.

The payment of the last instalment of the first loan of £20,000, which was the cost twenty years ago of the Selby Gas-Works, when they were acquired by the Local Authority, will shortly be made. The liquidation of the first debt is to be celebrated on the 21st inst., when the veteran Chairman of the District Council (Mr. M. Scott), who has been connected with Selby public life for over forty years, is to be entertained at a complimentary dinner.

The Directors of Messrs. Willey and Co., of Exeter, last Thursday posted the following notice at their works: "The Directors regret that they find it advisable to close their works from Friday, the 8th inst., to Wednesday, the 13th inst., owing to the stagnation of business, difficulty of obtaining and forwarding goods, and shortness of fuel and material caused by the coal strike." In an interview, Mr. F. Templer Depree, the Managing-Director, said that should no settlement of the strike be arrived at by Wednesday next, the Directors will be compelled to issue another notice suspending work for a further similar period. The closing of the factory means that between 600 and 700 men will be thrown out of employment.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

MANAGER. Sligo Gaslight Company. Applications by March 14.
DRAUGHTSMAN. No. 5537.
DRAUGHTSMAN AND CLERK OF WORKS. Cleckheaton Urban District Council.
MAINTENANCE INSPECTOR. Nelson Gas Department.
FOREMAN MAIN AND SERVICE LAYER. Cleckheaton Urban District Council.
FOREMAN STOKER. Blackpool Gas Department.
GASHOLDER BUILDER'S ERECTOR. No. 5535.

Appointments, &c., Wanted.

CHEMICAL PLUMBER, &c. No. 5492.

Business for Disposal.

WILLIAM BEAL, LIMITED. Pepper, Tangye, and Winterton, Birmingham.

Plant, &c. (Second-Hand), for Sale.

CARBONIZING PLANT, STOKING MACHINERY, HYDRAULIC MAINS, MOUTHPIECES, &c. Manchester Gas Department. Tenders by March 30.

Plant, &c. (Second-Hand), Wanted.

WASHER AND SCRUBBER, &c. Stanley Gas Company.

Controlling Interest in a Small Gas-Works for Sale. No. 5538.

Meeting.

BRITISH GASLIGHT COMPANY. 11, George Yard, E.C., March 27. Twelve o'clock.

Patent for Disposal, &c.

LIGHTING AND EXTINGUISHING DEVICE. "Lux," S. Gumaetii-Burea, Stockholm.

Stocks and Shares.

AYLESBURY GAS COMPANY. Mart, E.C. March 19. Two o'clock.
SOUTH ESSEX WATER COMPANY. Mart, E.C. March 19. Two o'clock.
YORKTOWN, &c., GAS COMPANY. Mart, E.C. March 19. Two o'clock.
WESTGATE AND BIRCHINGTON GAS COMPANY. By Auction. Mart, E.C. March 19.
WORTHING GAS COMPANY. Mart, E.C. March 19. Two o'clock.

TENDERS FOR

Coke.

WANDSWORTH AND PUTNEY GAS COMPANY. Tenders by March 18.

Fire-Clay Goods.

LOUGHBOROUGH GAS DEPARTMENT.

General Stores (Brass and Meter Fittings, Iron and Steel, Ironmongery, Lead and Lead Pipe, Drysaltery, Oils, Paints, Shovels, &c.)

DARLINGTON GAS DEPARTMENT. Tenders by March 21.

Iron and Steel Work, &c.

SHEFFIELD GASLIGHT COMPANY. Tenders by March 26

Meters.

LEEDS GAS DEPARTMENT. Tenders by March 23.

Pipes, &c.

DARLINGTON GAS DEPARTMENT. Tenders by March 21.
LEEDS GAS DEPARTMENT. Tenders by March 23.

Tar.

COLNE GAS DEPARTMENT. Tenders by March 19.
SOUTH SHIELDS GAS COMPANY. Tenders by March 18.

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Scotland and Ireland:
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